VOL. XXIV. Nº 5 MAY 1939

MECCANO MAGAZINE

THE NEW "CORONATION SCOT"

6d.

★ **MORE FUN . . MORE THRILLS . . MORE VALUE . .**

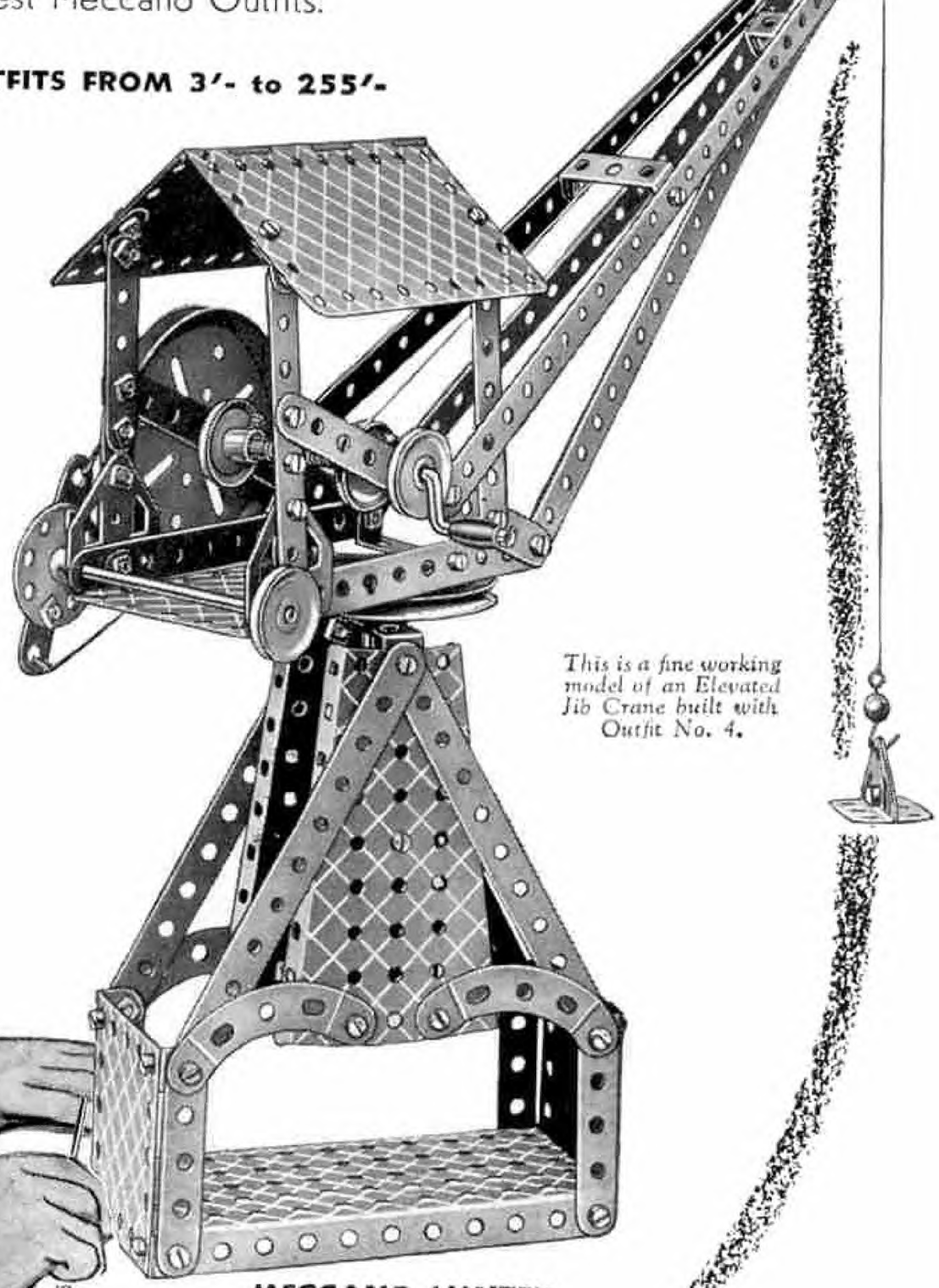
WITH MECCANO

Every Outfit bigger—so that you can build more models. Every model better—so that you get more fun making and playing with them. Boys! These thrilling improvements have made Meccano more than ever the greatest hobby in the world.

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This is a fine working model of an Elevated Jib Crane built with Outfit No. 4.

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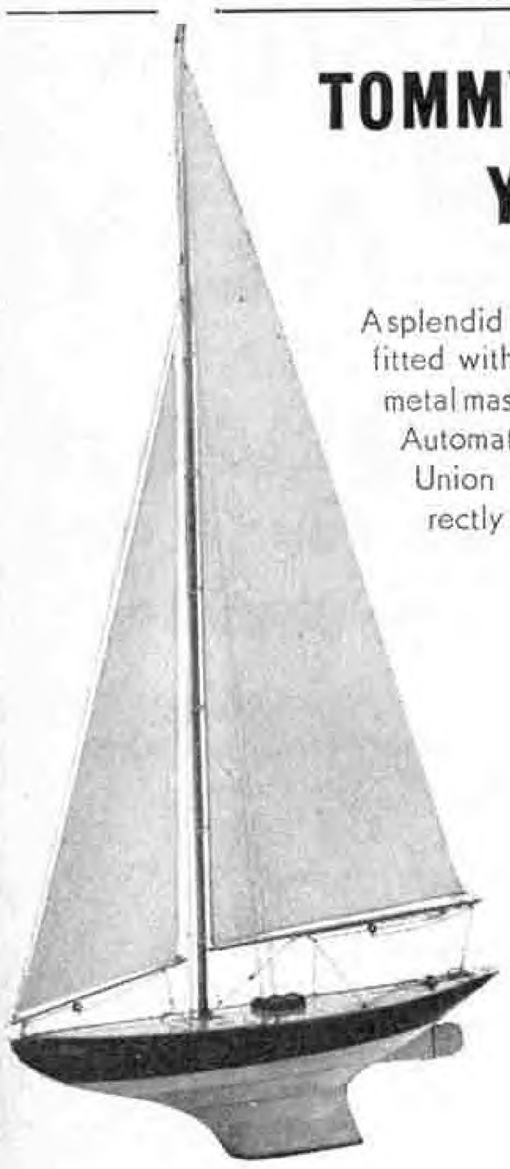
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TOMMY'S YACHT

A splendid Racing Yacht fitted with lightweight metal masts and booms. Automatic steering, Union silk sails correctly tailored.



Tommy Claims Foul Play!

Interviewed by our reporter after the accident had occurred, Tommy, challenger for the "Local Pond Trophy," said indignantly: "Such a thing has never happened to me before. Someone must have tampered with the rudder of my yacht. The accident couldn't have happened otherwise. Why, I bought my yacht at Hamley's and you know that **they** never let you down!"

"K" CLASS YACHTS

Very fine models. Lightweight metal hull, tailored sails, every yacht guaranteed to sail.



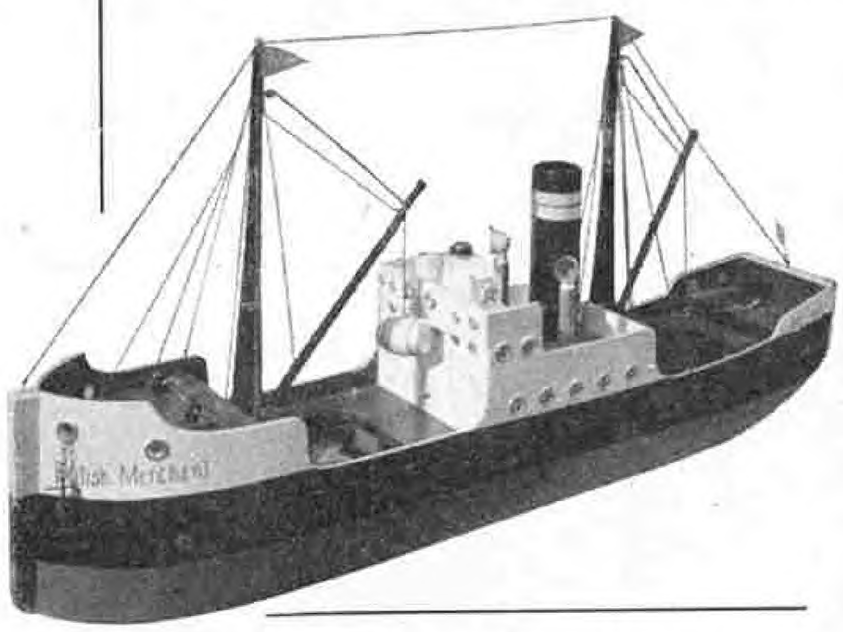
14" Hull	...	price 3/11	...	post 6d.
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20" „	...	„ 7/6	...	„
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Heather Elf	...	length 18"	...	price 30/-
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Heather Glen	...	„ 36"	...	„ £6/12/6
White Heather II	...	„ 42"	...	„ £9/9/-

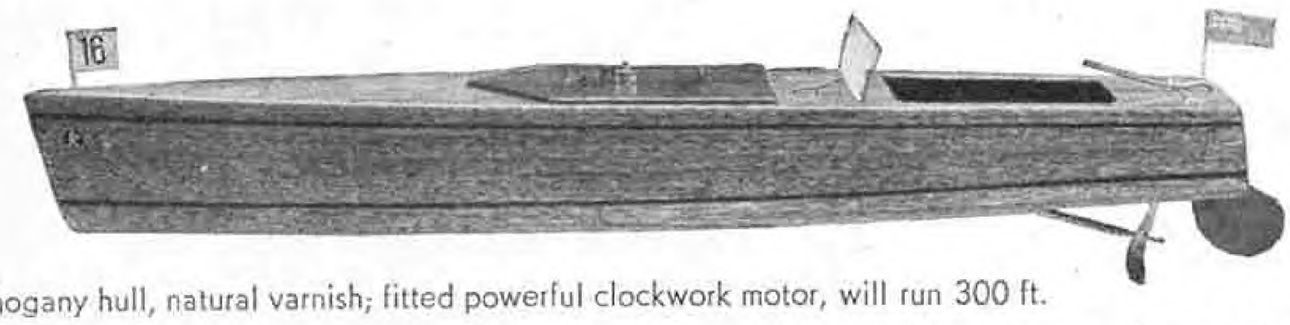
GOT ANY CARGO?

Because if you have, here's just the thing for you. This COASTAL STEAMER has a powerful clockwork motor, two working derricks, anchor and winch, dummy ventilators, portholes and navigation lights. Complete with cargo. Length 30 in. Price **29/6**

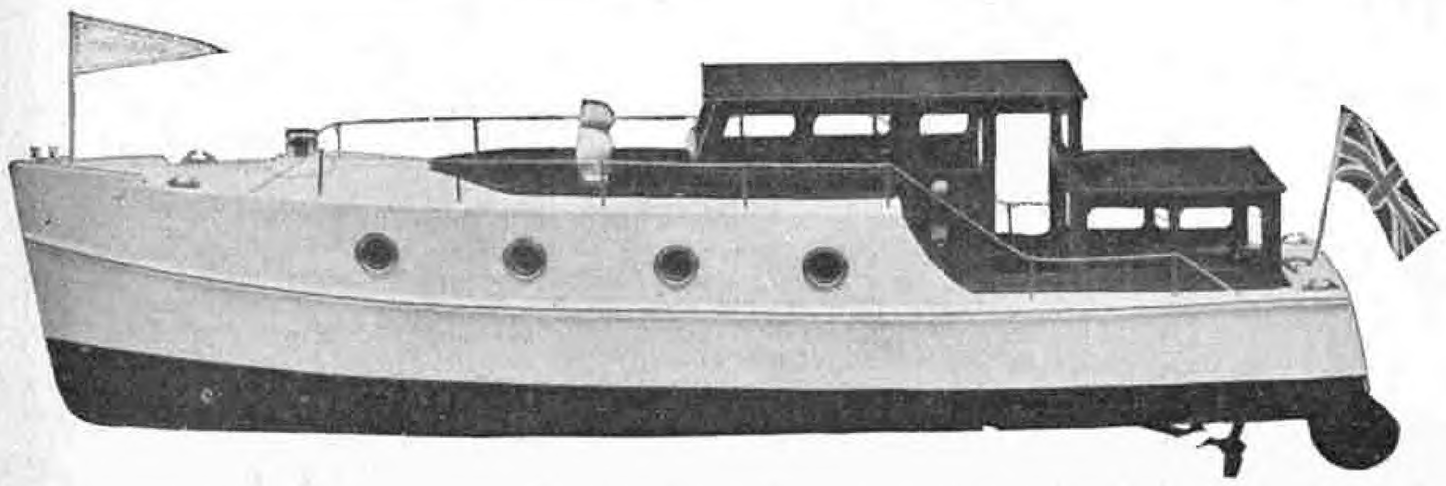
Smaller sizes: 17/6. 10/6 and 7/6. Post 9d.



HAMLEY'S SPECIAL SPEED BOAT



Mahogany hull, natural varnish; fitted powerful clockwork motor, will run 300 ft. on one winding. Wind screen, flags, adjustable steering. Hull length 25". Price **10/6**



CABIN CRUISER

Electric motor, mahogany super-structure, separate switches for motor and navigation lights.

"Dido"	...	length 20"	...	price 37/6
"Juno"	...	„ 23"	...	„ 45/-
"Venus"	...	„ 28"	...	„ 55/-

(Batteries for Venus 2/6 extra)



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THE best way to success is to *look* efficient as well as to *be* efficient. Brylcreem will help you by making your hair easy to manage and giving it a naturally smart appearance.

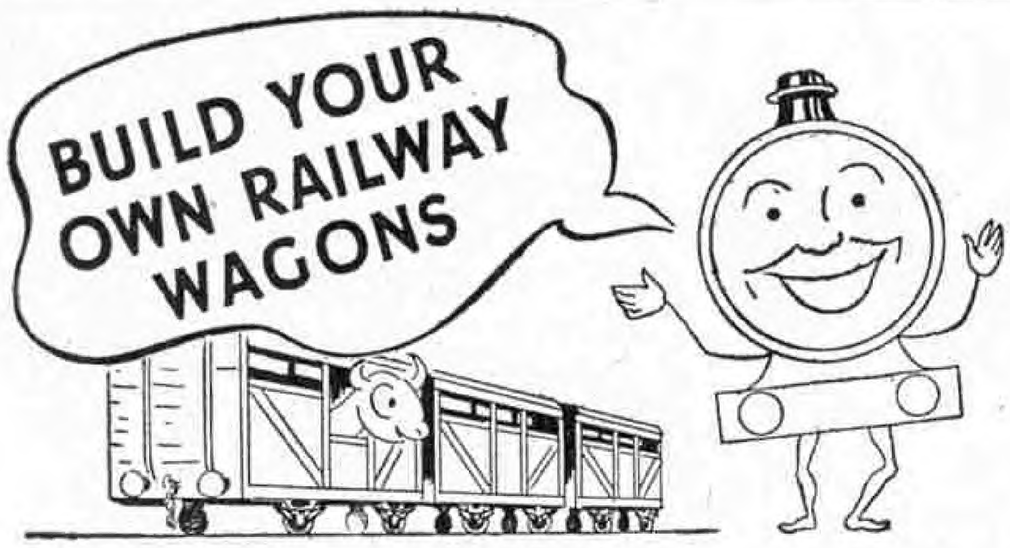
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The County Perfumery Company, North Circular Road, West Twyford, London, N.W.10 royds C.591

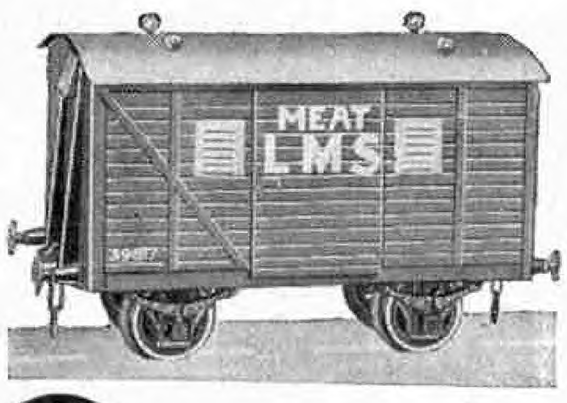


Half the fun of running your rolling stock is the knowledge that you have built it yourself. Milbro true-to-scale replicas of Cattle Wagons, Box Wagons, Open Wagons, etc., are supplied with working blue print for easy assembly. It's cheaper to buy them this way, too, than ready assembled.

MEAT VANS

A fine reproduction of its prototype, made from best quality seasoned timber.

Go—Finished **10/6** each
Gl— „ „ **17/6** each



Milbro rolling stock, locos and track parts are **the real thing in miniature!** *Precision-built to give the same exacting service expected of the great British railway systems. Send 6d. for Catalogue describing the full Milbro range.*

MILBRO *TRUE-TO-SCALE replicas for reliability*

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BINDING THE "M.M."

Binding cases for back numbers of the Magazine may be obtained from Messrs. O. H. Bateman and Co., 23, Hanover Street, Liverpool. These are supplied in two sizes (1) for six copies price 3/3 and (2) for twelve copies price 4/9, post free in each case. The binding cases are supplied in what is known as "Quarter Basil, full cloth." They are tastefully embossed in gold with the name "Meccano Magazine," and on the back is the name and volume number.

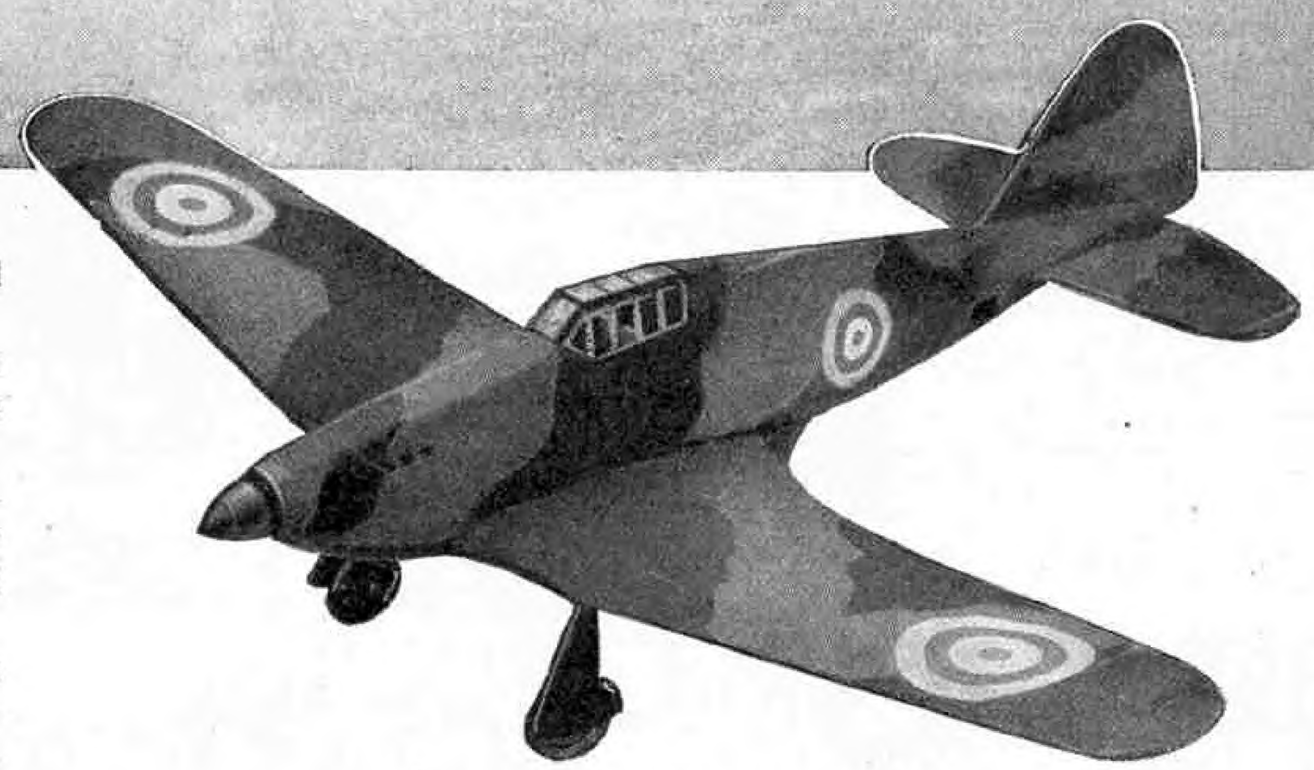
Binding 6 and 12 copies. These binding cases are supplied so that readers may have their Magazines bound locally, but where desired, the firm mentioned above will bind Meccano Magazines at a charge of 5/9 for six issues or 7/6 for twelve issues, including the cost of the binding and also return carriage. The covers of the Magazines may be included or omitted as required, but in the absence of any instructions to the contrary they will be included.

Whilst the binding of the twelve Magazines is quite satisfactory, they form a rather bulky volume and for that reason arrangements have been made to bind six months' Magazines where so desired, as explained above.



PERFORMANCE IS PROOF

The correctness of aircraft design is measured by performance.
FROG construction kits enable the enthusiast to build a model with both high performance and excellent appearance.
Now is the time to build your model aeroplane. Buy a FROG construction kit and see how easy it is to make a "super" machine. *No tools required —all parts cut to shape.*
Prices range from 1/6 to 21/-, and include flying scale models of military and civil aircraft also. Competition models to S.M.A.E. specification.



HAWKER HURRICANE KIT **2/-**

DO NOT MISS THE NEW KITS!
Supermarine Spitfire 2/- and Vickers Wellesley 2/6
AVAILABLE SHORTLY

NO TOOLS REQUIRED · ALL PARTS CUT TO SHAPE · INSTRUCTIONS EASY TO FOLLOW · EXCELLENT PERFORMANCE

FROG **MODEL AIRCRAFT**

Covered by World Patents granted and pending.
Made in England by International Model Aircraft Ltd.

OBTAINABLE AT ALL GOOD TOYSHOPS AND STORES *Sole Concessionaires*

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COUPON *Please send me your "Frog" coloured leaflet with particulars of the "Frog" Flying Club and how to obtain handsome enamelled "Frog" Pilot badges.*

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PLEASE WRITE IN BLOCK LETTERS 5/39

START COLLECTING

DINKY TOYS

PERFECT SCALE MODELS





Territorial Army Field Brigade in action with 18-Pounder Guns, and (right) a 3-inch Anti-Aircraft Gun with crew.

MOBILE ANTI-AIRCRAFT UNIT



Dinky Toys No. 161

Comprises scale models of a quick-firing anti-aircraft Gun mounted on a mobile platform and a Searchlight mounted on a lorry. Both Gun and Searchlight have elevating and swivelling movements. Price **3/-** per set

18-POUNDER QUICK-FIRING FIELD GUN UNIT



Dinky Toys No. 162

Comprises scale models of an 18-pounder quick-firing Field Gun, Trailer and "Light Dragon" Motor Tractor. Price **2/-** per set

Nowadays every boy is interested in the Mechanised Units of the British Army. The Royal Tanks Corps Sets have been great favourites since their introduction into the Dinky Toys range in 1937. The 18-Pounder Field Gun Unit and the Anti-Aircraft Unit that have just been added promise to enjoy even greater popularity.

ROYAL TANK CORPS MEDIUM TANK SET



151a 151d 150d 151c 151b

Dinky Toys No. 151

No. 151a	Medium Tank	...	each	**1/6**	No. 151d	Water Tank Trailer	each	**6d.**
No. 151b	Transport Wagon	...	"	**1/1**	No. 150d	Driver	"	**3d.**
No. 151c	Cooker Trailer	...	"	**7d.**				

Price of complete set **3/11**

ROYAL TANK CORPS LIGHT TANK SET

152 a 150 d 152 b 152 c

Dinky Toys No. 152

No. 152a	Light Tank	...	each	**1/2**	No. 152c	Austin Seven Car	each	**4d.**
No. 152b	Reconnaissance Car		"	**1/-**	No. 150d	Driver ...	"	**3d.**

Price of complete set **2/9**





A FASCINATING COLLECTING HOBBY

DINKY TOYS

OVER 300 VARIETIES

Collecting Dinky Toys is one of the most fascinating of all hobbies. These realistic miniatures are unique in their rich colouring and perfection of design and finish, and their range is so wide as to appeal to all tastes. New items are continually being introduced. This month we draw special attention to the two new Aeroplane Presentation Sets. The machines included form a splendid collection.

D.H. "COMET" AEROPLANE



Dinky Toys No. 60g

Scale model of the aeroplane used by Flying Officer A. E. Clouston and Mr. V. Ricketts in their record flight to New Zealand and back. Price **6d.** each

DOUGLAS "D.C.3" AIR LINER



Dinky Toys No. 60t

Scale model of the Douglas "D.C.3" air liner, which is in regular service on American and European routes.
Price **9d.** each

NEW THIS MONTH!!

PRESENTATION AEROPLANE SETS

Dinky Toys No. 64

This set, in presentation box, consists of one each of Dinky Toys No. 60g D.H. "Comet" Aeroplane, No. 62h Hawker "Hurricane" Single-Seater Fighter (Shadow Shaded), No. 62s Hawker "Hurricane" Single-Seater Fighter (Aluminium Finish), No. 62k The King's Aeroplane–Airspeed "Envoy," No. 62m Airspeed "Envoy" Monoplane, No. 63b Seaplane "Mercury."
Price **3/3** per set

Dinky Toys No. 65

This set, in presentation box, consists of one each of Dinky Toys No. 60r Empire Flying Boat, No. 60t "Douglas DC3" Air Liner, No. 60v "Whitley" Bomber, No. 60w "Clipper III" Flying Boat, No. 62n Junkers Ju 90 Air Liner, No. 62p Armstrong Whitworth "Ensign" Air Liner, No. 62r De Havilland "Albatross" Air Liner, No. 62w Imperial Airways "Frobisher" Class Air Liner. Price **7/-** per set

FAIREY "BATTLE" BOMBER



Dinky Toys No. 60n

Model of the Fairey "Battle" day bomber, a type much used by the R.A.F. It carries a pilot and gunner. Price **4½d.** each

EMPIRE FLYING BOATS



Dinky Toys No. 60r

Scale models of the famous Imperial Airways Flying Boats. Twelve models available named: *"Caledonia," "Canopus," "Corsair," "Challenger," "Centurion," "Cambria," "Capella," "Ceres," "Clio," "Calypso," "Corinna"* and *"Cheviot."* Price **1/-** each

ATLANTIC FLYING BOAT

Dinky Toys No. 60x

Similar in type to the Empire Flying Boat. Assorted colours. Price **1/-** each

ARMSTRONG WHITWORTH "WHITLEY" BOMBER



Dinky Toys No. 60v

Scale model of the "Whitley" long-range heavy bomber adopted by the R.A.F.
Price **9d.** each

ARMSTRONG WHITWORTH "WHITLEY" BOMBER

(With Shadow Shading)
Dinky Toys No. 62t

Similar to Dinky Toys No. 60v but with Air Ministry Shadow Shading. Price **11d.** each

FLYING BOAT "CLIPPER III"



Dinky Toys No. 60w

Scale model of the Pan American Airways flying boat that took part in the transatlantic experimental flights in 1937

Price **1/-** each

AIRSPEED "ENVOY" MONOPLANE



Dinky Toys No. 62m

Scale model of the Airspeed "Envoy" twin-engined commercial monoplane. Assorted colours. Price **6d.** each

THE KING'S AEROPLANE

Dinky Toys No. 62k

Scale model of the Airspeed "Envoy" supplied to the Air Council for the King's Flight. Price **8d.** each

JUNKERS Ju 90 AIR LINER



Dinky Toys No. 62n

Scale model of the latest type of German air liner, having a top speed of 256 m.p.h. Price **11d.** each

GIANT HIGH-SPEED MONOPLANE

Dinky Toys No. 62y

Similar in type to Junkers "Ju 90" air liner. Assorted colours. Price **11d.** each

ARMSTRONG WHITWORTH "ENSIGN" AIR LINER



Dinky Toys No. 62p

Scale model of the largest British air liner. Six models available, named *"Ensign," "Elsinore" "Explorer," "Echo," "Ettrick"* and *"Elysian."* Price **1/-** each

BRITISH 40-SEATER AIR LINER

Dinky Toys No. 62x

Similar in type to the Armstrong Whitworth "Ensign" air liner. Assorted colours.
Price **1/-** each

IMPERIAL AIRWAYS "FROBISHER" CLASS LINER



Dinky Toys No. 62w

Scale models of the Imperial Airways "Frobisher" class liners. Three models available, named: *"Frobisher," "Falcon"* and *"Fortuna."*
Price **10d.** each

DE HAVILLAND "ALBATROSS" MAIL LINER

Dinky Toys No. 62r

Scale model of one of the "Albatross" mail liners built for the Air Ministry for experimental flights.
Price **10d.** each

HAWKER "HURRICANE" SINGLE-SEATER FIGHTER (Aluminium Finish)



Dinky Toys No. 62s

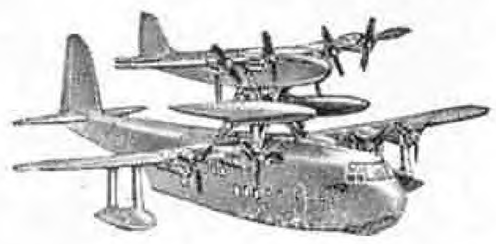
Similar to Dinky Toys No. 62h, but with Aluminium finish. Price **6d.** each

HAWKER "HURRICANE" SINGLE-SEATER FIGHTER (Shadow Shaded)

Dinky Toys No. 62h

Scale model of the Hawker "Hurricane" Single-Seater Fighter extensively used by the R.A.F. Price **6d.** each

MAYO COMPOSITE AIRCRAFT



Dinky Toys No. 63

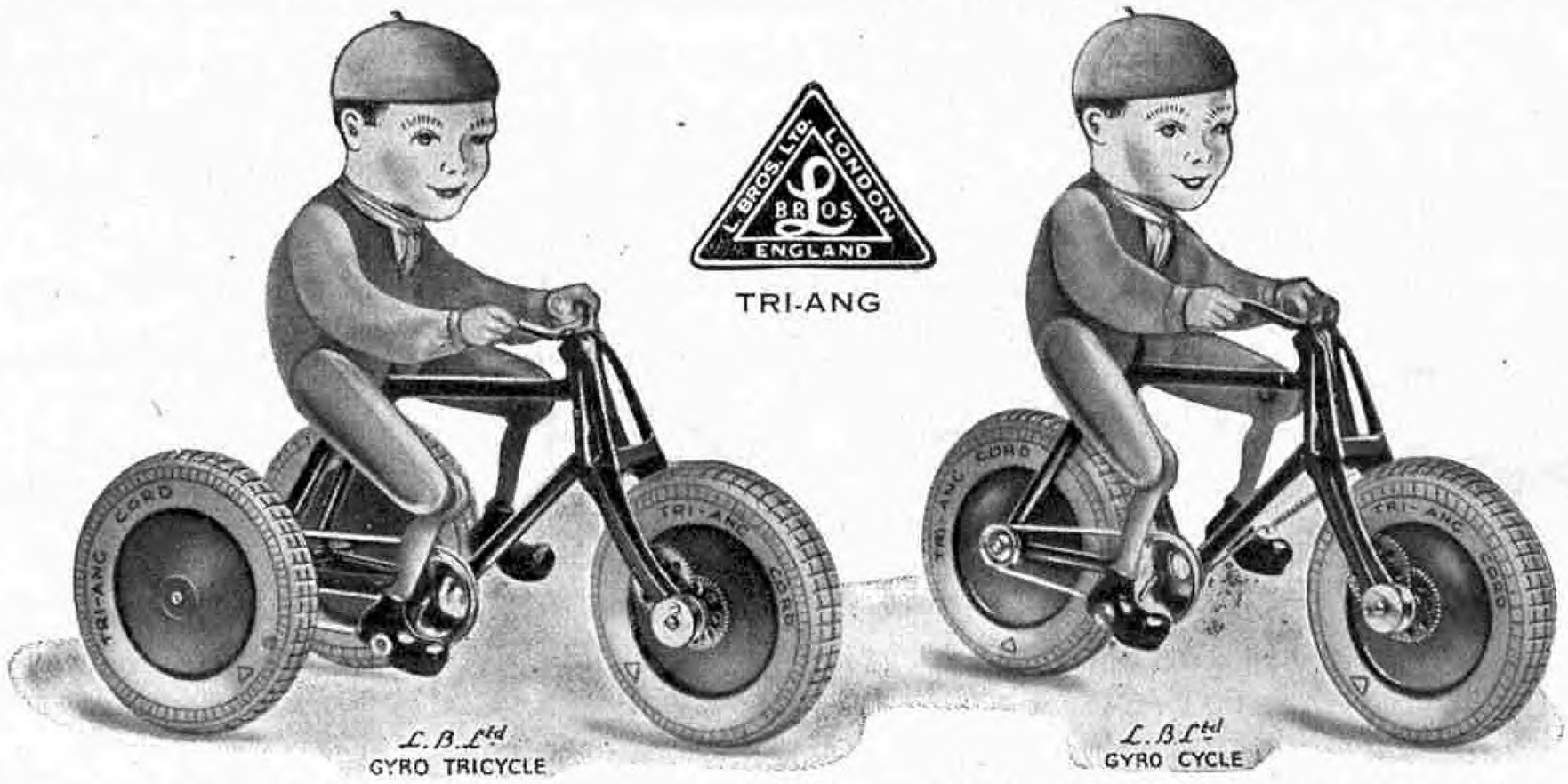
Scale model of the Mayo Composite Aircraft.
Price **2/-** each

The components of the above can be purchased separately.

No. 63a Flying Boat *"Maia"* ... **1/3** each
No. 63b Seaplane *"Mercury"* ... **9d.** each

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TRI-ANG
GYRO TRICYCLE AND GYRO CYCLE



Patent Pending.

The Gyro Tricycle is an outstanding novelty with many new tricks, fitted with Gyroscope in front wheel on similar principle to the famous Gyro Cycle. Price **5/11**

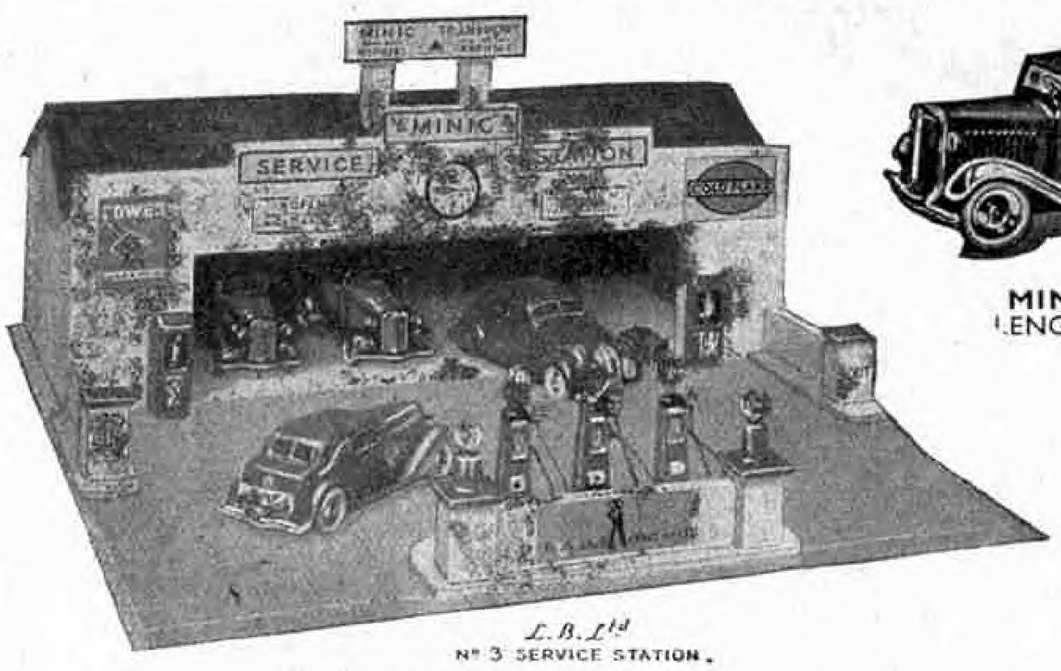
British patent 479,430. Patents pending in other Countries.

The gay little figure astride the saddle appears to balance himself as he pedals merrily all over the place, and with his flexible arms creates the illusion in the most realistic way that he is steering the Gyro Cycle by the handlebars. Price **5/-**

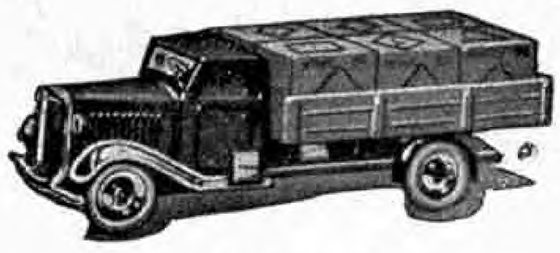
ASK YOUR DEALER TO GIVE YOU A DEMONSTRATION

MINIC MODELS
ROAD TRANSPORT TRUE TO SCALE

Here's a fascinating new hobby, collecting real true-to-scale models of every form of road transport, with perfect replicas of garages, petrol stations, etc. If you are already a model railway enthusiast become a transport enthusiast as well—or start with a hobby by becoming a model transport collector. Almost every type of road transport is represented. Each model is strongly constructed and fitted with long running mechanism and some are even fitted with electric lights.



MINIC Service Station No. 3.
Realistic design, imitation red tiled roof with sign, three large petrol pumps, one large oil cabinet, two electric lights and battery, dummy clock face and other signs. LENGTH 16 ins. Price **8/11**
CARS NOT INCLUDED.



MINIC Lorry with Cases.
LENGTH 5¼ ins. Price **1/6**



MINIC Taxi.
LENGTH 4¼ ins. Price **2/-**



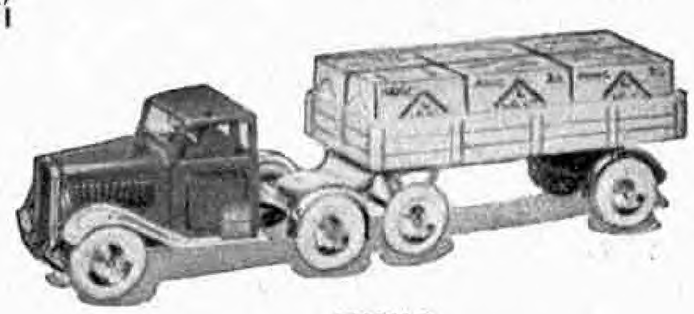
MINIC Traffic Control Car.
LENGTH 5 ins. Price **1/6**



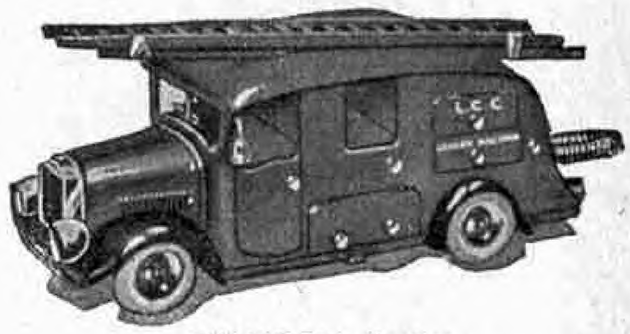
MINIC Daimler Sunshine Saloon with Electric Headlamps and Battery.
LENGTH 5¼ ins. Price **3/6**
Without Electric Lights ,, **2/6**



MINIC Breakdown Lorry with Mechanical Crane.
LENGTH 5½ ins. Price **3/6**



MINIC
Mechanical Horse and Trailer with Cases.
LENGTH 7⅞ ins. Price **2/6**



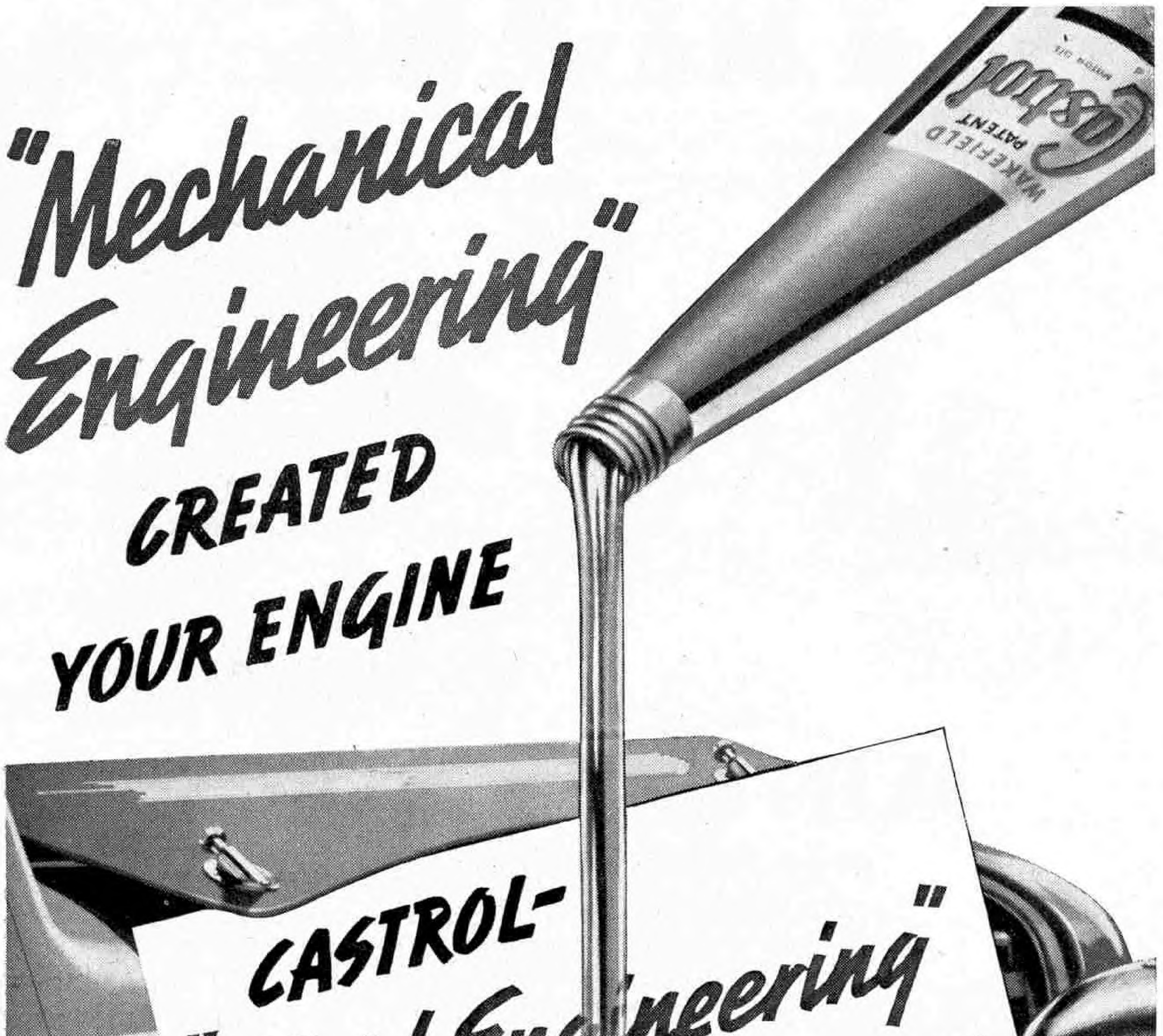
MINIC Fire Engine with Electric Headlamps and Battery.
LENGTH 6¼ ins. Price **5/-**

New Models To Add To Your Collection

These new models will be in your Toy Shop shortly. Farm Lorry, Timber Lorry, Canvas Tilt Lorry, Coal Lorry, Mechanical Horse and Milk Tanker, Ambulance, Cable Lorry, Trolley Buses, Balloon Barrage Wagon.

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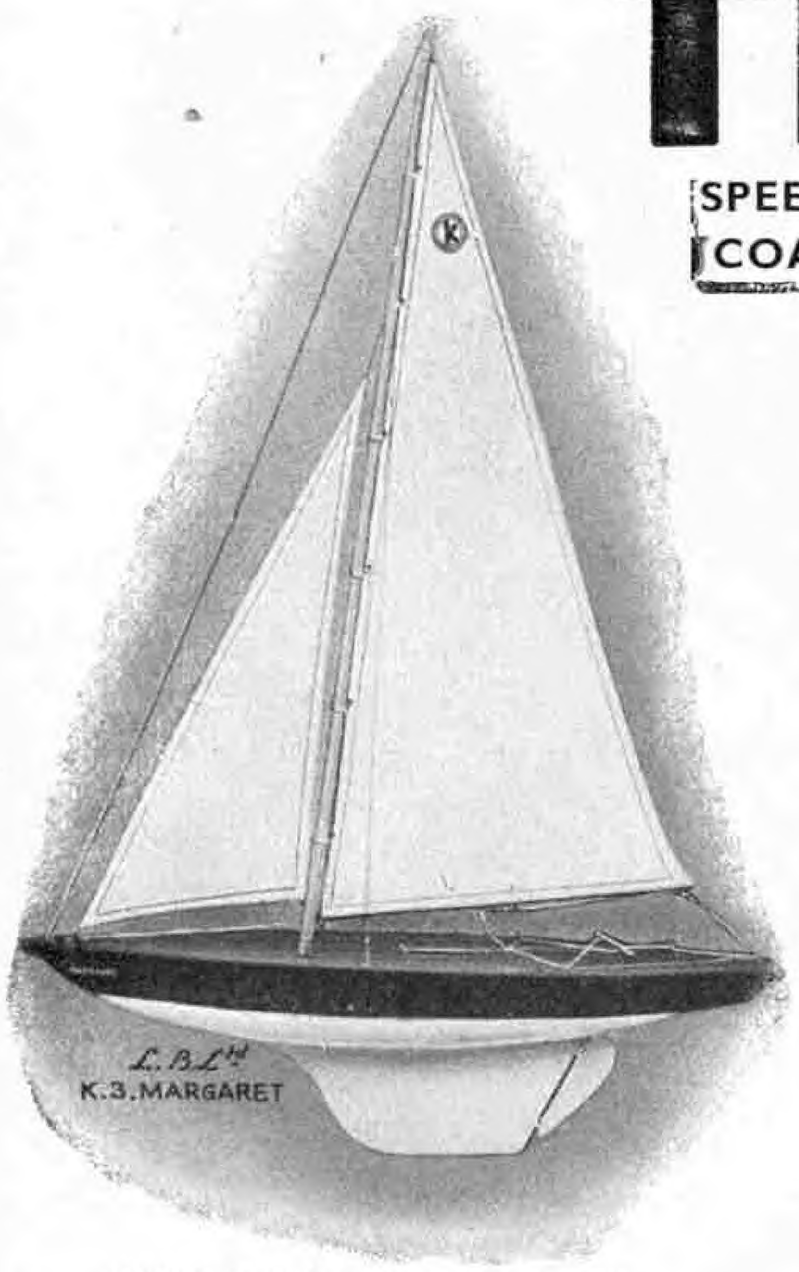


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SPEED BOATS, ELECTRIC CABIN CRUISERS
COASTAL STEAMERS, FISHING SMACKS
CLOCKWORK STEAM DRIFTERS
AND

YACHTS



"K" YACHT "MARGARET"

Magnificent craft with AUTOMATIC STEERING. Patent light-weight weather resisting hull. Solid mahogany polished deck. Mast and boom made from finest selected material, best quality sails, fully adjustable. Beautifully finished in blue and white. Length of hull, 26 in. **Price 21/–**

NEW !!
Tugboat Construction Kit
Price 3/11.
No Tools. All Parts to Shape.
Clockwork Motor included.



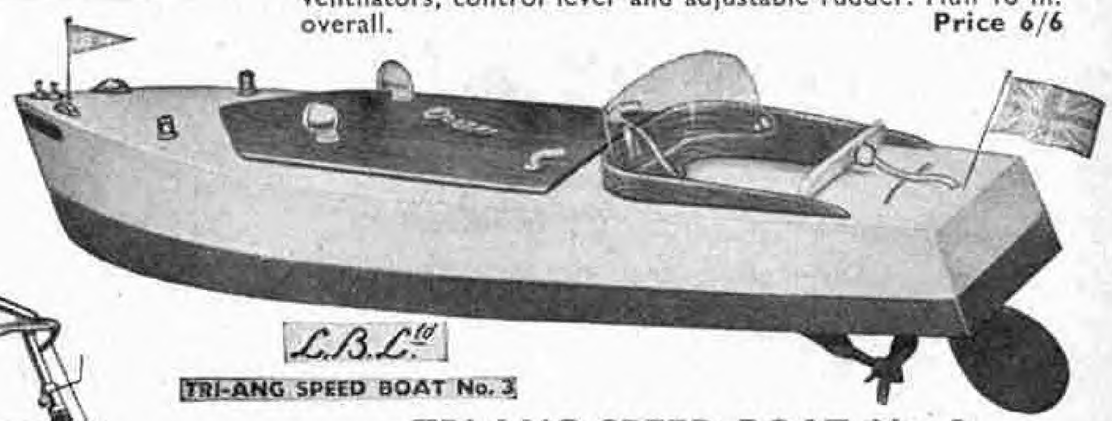
CLOCKWORK STEAM DRIFTER

Realistic model with strong, long running clockwork mechanism, adjustable mizzen sail and rudder, dummy ventilators, etc. Length of hull, 16½ ins. **Price 17/6**



K SPEED BOAT No. 1

Fitted with powerful mechanism, windscreen, dummy ventilators, control lever and adjustable rudder. Hull 16 in. overall. **Price 6/6**



TRI-ANG SPEED BOAT No. 3

Specially designed hull with mahogany deck, brass fittings, ventilators and detachable motor cover. Very powerful clockwork mechanism. Complete with bow pennant and stem flag. Hull 20½ in. overall. Electric Motor 22/6 **Price 21/–**

TRI-ANG "FAIRYCYCLES" (Regd.) and TRICYCLES (Regd.)



TRI-ANG "UNITY" JUVENILE CYCLES



TRI-ANG TRICYCLE No. 5B (Regd. Trade Mark)

Cycle chain drive with free-wheel. Ball-bearings throughout. Frame and forks best quality weldless cycle tubing. 16 in. front and rear wheels. 1¾ in. jointless sponge-rubber tyres. Roller lever brake. Coil spring saddle. CHROMIUM FITTINGS. Black, blue or maroon. **Price 59/6**

"UNITY" BOY'S CYCLE No. 18 PB

18 in. frame. Finest quality British cycle tube. Wheels 18 in. x 1⅜ in. CHROMIUM-PLATED rims. Dunlop pneumatic tyres. Roller lever pattern brakes. Three-coil saddle. ½ in. x ⅛ in. roller chain. Ball-bearings throughout. Complete with equipment and finished in black, blue or maroon. All usual bright parts CHROMIUM-PLATED. Ages 7 to 11. **Price 63/–**

TRI-ANG
Obtainable at all good Toy Shops and Stores.



"FAIRYCYCLE" (Regd.) MODEL No. 2

Cycle tubular frame and forks. 14 in. wheels. 1¾ in. jointless sponge-rubber tyres. Ball-bearing pedals. Roller lever brake. Two-coil saddle. Chain cover. Stand. CHROMIUM-PLATED FITTINGS. Black, blue or maroon. **Price 39/6**

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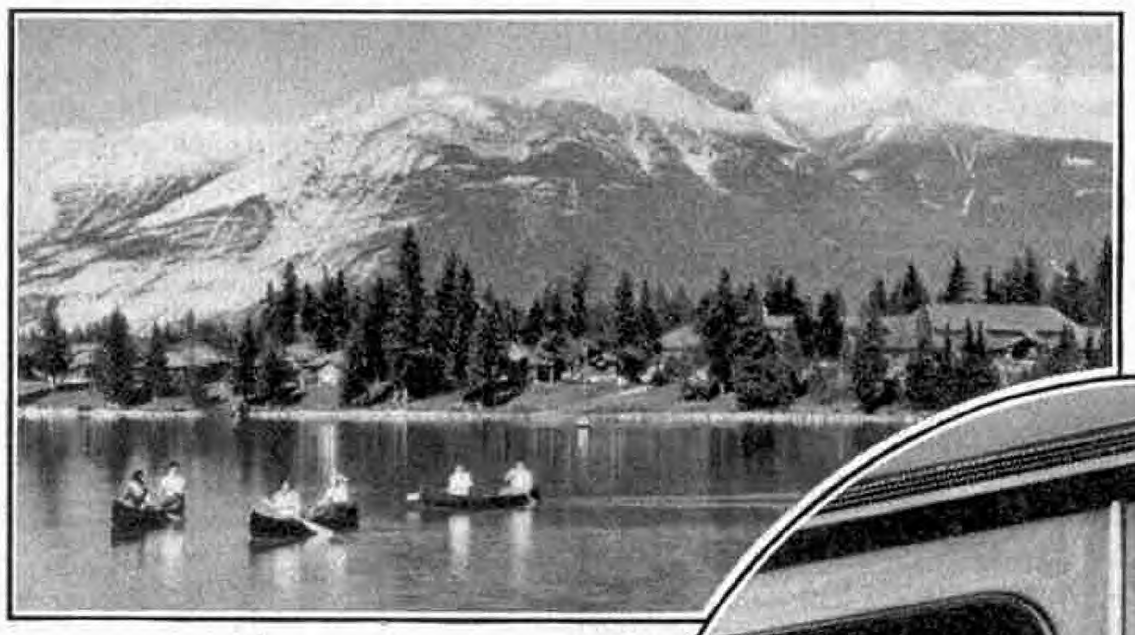
NEXT MONTH: "SEEKING BURIED TREASURE." PUBLISHING DATE: 1st JUNE

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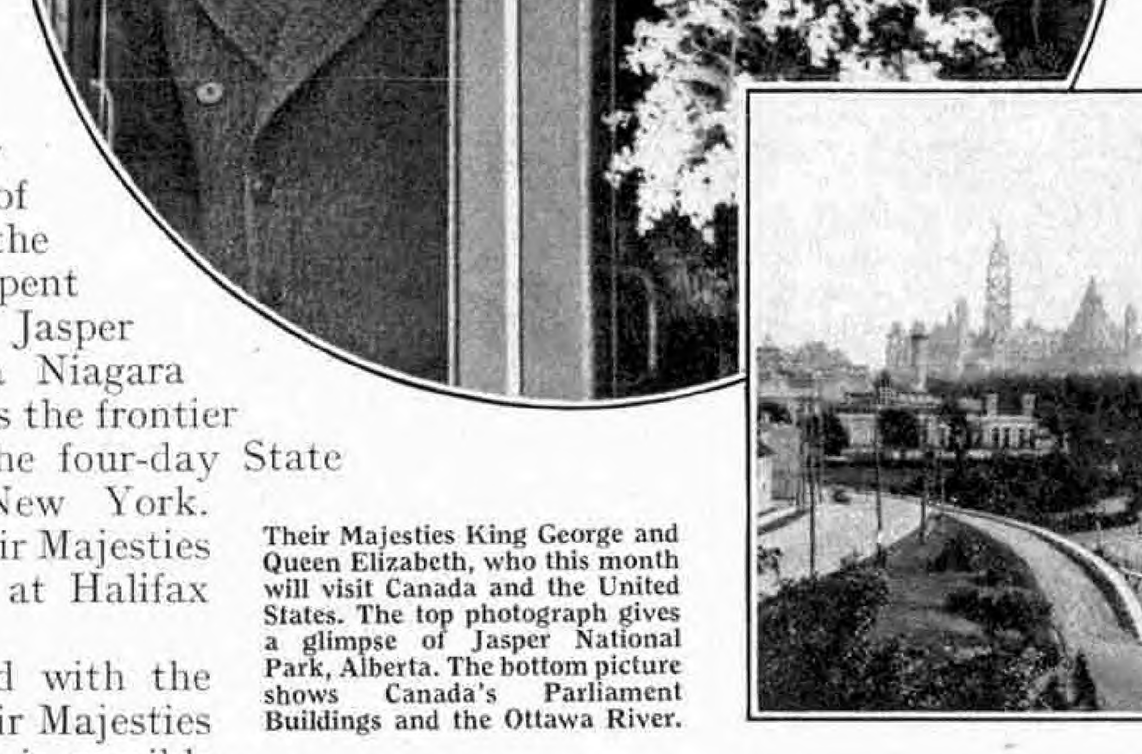
With the Editor



The visit of King George and Queen Elizabeth will make this month a notable one in the history of Canada. Their Majesties will cross the Atlantic in H.M.S. "*Repulse*" and will proceed in easy stages right across the Dominion to Victoria on Vancouver Island, a westward journey of 3,200 miles, in the course of which their train will cross the Rocky Mountains at a height of 5,329 ft. above sea level. On the return eastward a day will be spent at Jasper in the famous Jasper National Park. Running via Niagara Falls, the Royal train will cross the frontier into the United States for the four-day State visit to Washington and New York. Then, returning to Canada, their Majesties will rejoin H.M.S. "*Repulse*" at Halifax for their return home.

The tour has been planned with the two-fold purpose of giving their Majesties as full a picture of Canada as is possible in the time, and of allowing the greatest possible number of their Canadian subjects to see them at the train windows in towns and villages where the train is not scheduled to stop.

The train in which their Majesties will make the round trip across the North American Continent has been specially prepared; a full description of it will be found on page 266.





Their Majesties King George and Queen Elizabeth, who this month will visit Canada and the United States. The top photograph gives a glimpse of Jasper National Park, Alberta. The bottom picture shows Canada's Parliament Buildings and the Ottawa River.

"The Coronation Scot" in America

Most of my readers will have been interested in the description of the new "*Coronation Scot*" train that appeared in the "*M.M.*" a month or two ago. Since then the train has been transported to the United States for exhibition at the New York World's Fair that opened yesterday. Prior to the Fair it was engaged in a tour of over 3,000 miles from Baltimore to Chicago and back to New York.

It was the G.W.R. locomotive "*King George V*" that in 1927 commenced the modern series of visits of British locomotives and trains to the United States. Then in 1933 the L.M.S. "*Royal Scot*" locomotive and a representative train made a tour of over 11,000 miles in the United States and Canada; and now the "*Royal Scot's*" younger relative, the streamlined "*Coronation Scot*," has gone to demonstrate British railway progress on the other side of the Atlantic. It is unfortunate that loading gauge restrictions make it impossible for us to see an American locomotive in steam on British track. However, we shall at least be able to hear the sound of a real American engine whistle when the train returns, for one has been presented to the locomotive.

The King and Queen in Canada

Across a Continent in a Royal Train

By James Montagnes

WHEN King George and Queen Elizabeth arrive in Canada on the 15th of this month for a tour of the Dominion and the United States, they will find awaiting them at Quebec a home on wheels, a train in which they will sleep at least 15 nights. Since sleep will be an essential for the Royal visitors on the tiring round-trip across the North American continent, their home on wheels has been arranged not only for transportation, but also to give them the maximum possible rest.

When their Majesties travel in the United Kingdom they have at their journey's end a Royal palace to which to retire. In Canada there are no palaces, but the Dominion Government maintain two homes for the Governor-General, who is the King's personal representative. These are at Ottawa and Quebec City; and in these two cities their Majesties will make their homes in the viceregal residences, not on the Royal train.

There will be two trains on the Royal tour of Canada. The first, the pilot train, will house the newspaper reporters and photographers, and some of the officials connected with the tour. The second train will have two cars reserved for their Majesties, the remaining 12 cars being for other members of the Royal party, the Prime Minister of Canada, and officials.

The two cars exclusively reserved for the King and Queen, entrance to which will be guarded at all times by Royal Canadian Mounted Police and Scotland Yard detectives, are the regular cars used by the Canadian Governor-General. These cars have undergone a complete overhauling and refurnishing. One contains three bedrooms, with two tiled bathrooms complete with tub and shower baths; the second contains a dining room, lounge, secretarial office, and two bedrooms. Both cars, like the rest of the train, are built of steel, and will be air-conditioned to give an even temperature inside whether it is hot or cold outside.

To each train will be attached a baggage car to store the many trunks of clothes that will be required by their Majesties and officials on the trip. There will be a modern dining car on each train, where all members of the tour will have their three or four meals daily, with all food cooked on the train. There will be also at least one modern lounge or club car on each train. For sleeping accommodation for all members of the tour there will be two kinds of sleeping cars—compartment and private cars with individual bedrooms for one or two persons, and the standard 24-berth sleeping cars. Because of the length of the trip, transcontinental sleeping cars will be used with shower bath and barber shop facilities. All cars will be air-conditioned.

Telephones will be installed on the train, and special crews will at all times be ready to link the train with the rest of the world, so that their Majesties may be able to chat with their young daughters, Princess Elizabeth and Princess Margaret Rose, and friends. Should State or family matters require the King's attention while the train is travelling between various points in Ontario, it will be possible to halt the train and connect telephone apparatus to adjacent telephone or telegraph lines. The telephone will be supervised by the Royal Canadian Mounted Police.

The train will be made up of cars from both Canadian roads, the Canadian National and Canadian Pacific Railways. Equipment will not be distinguishable, however, all cars being specially renovated for the trip, with distinguishing markings eliminated and even the outside of the cars painted the same colours, royal blue and silver.

On account of the nature of the country through which Canadian trains travel, ranging from the flat land of the western prairies to the Rocky Mountains, various types of locomotives are necessary. Part of the way, the modern streamlined engines of the two roads will pull the train. A typical modern streamliner of the Canadian National Railways is shown in the illustration on this page. This is one of the giants of the "6400" class, which have the 4–8–4 wheel arrangement. They are very striking-looking engines and were introduced a year or two ago for service on the "*International Limited*" and other important expresses. In the mountains special type locomotives, capable of pulling great loads uphill, will pilot the cars. The trains will not make any speed records, but will traverse the Dominion in such a manner as to give their Majesties a good view of the country, and at the same time enable as many people as possible in towns and villages where the train does not make a stop to see the Royal visitors at the train windows. The trains will not travel much at night, to allow their Majesties to rest as comfortably as possible for the strenuous days of receptions.



Streamlined 4-8-4 locomotive No. 6401 on a C.N.R. express. Engines of this class will take part in the running of the Royal Special. Photograph by courtesy of the Canadian National Railways.

The Royal train leaves Quebec City on the 16th of this month, and follows the broad St. Lawrence River through some of the oldest settled farming country in the Dominion to reach Montreal shortly after midday. From this largest city their Majesties will travel for a short distance during the night, to stop most of the night and continue about dawn to reach Ottawa early in the morning. After four days in Canada's capital city, with its background of lumbering country, the Royal train will make a one day and two night trip to Toronto, Canada's second largest city, where their Majesties will see the tallest buildings in the British Empire.

From Toronto the Royal train will travel at fast speed all night and the next day, with few stops, through much unsettled virgin forest lands and new mining regions, to Fort William and Port Arthur at the western tip of the Great Lakes. With a short stop during the night, the train will make good time on the next jump to Winnipeg, Canada's fourth city. Their Majesties will have covered 1,600 miles from the time they left Quebec city.

Next the train starts its trip across the flat prairies, where the horizon stretches out like the sea as far as the eye can see. Regina is reached after a night and morning trip, with a few short stops at smaller towns. From Regina another night on the train, more short stops, and Calgary in the Rocky Mountain foothills in the afternoon. That evening the train goes to Banff, where their Majesties will rest a day, may sleep in a hotel, and certainly will enjoy the beauties of this 2,500 square mile game and recreation preserve.

Running at approximately schedule time the Royal train will go through the Rocky Mountains in daylight, will make the descent to Vancouver during the night, and arrive at Vancouver, Canada's third largest city, early in the morning. Late in the afternoon the train will be left behind, as their Majesties cross the Strait of Georgia to Victoria, on Vancouver Island. At Victoria they will spend the night at the residence of

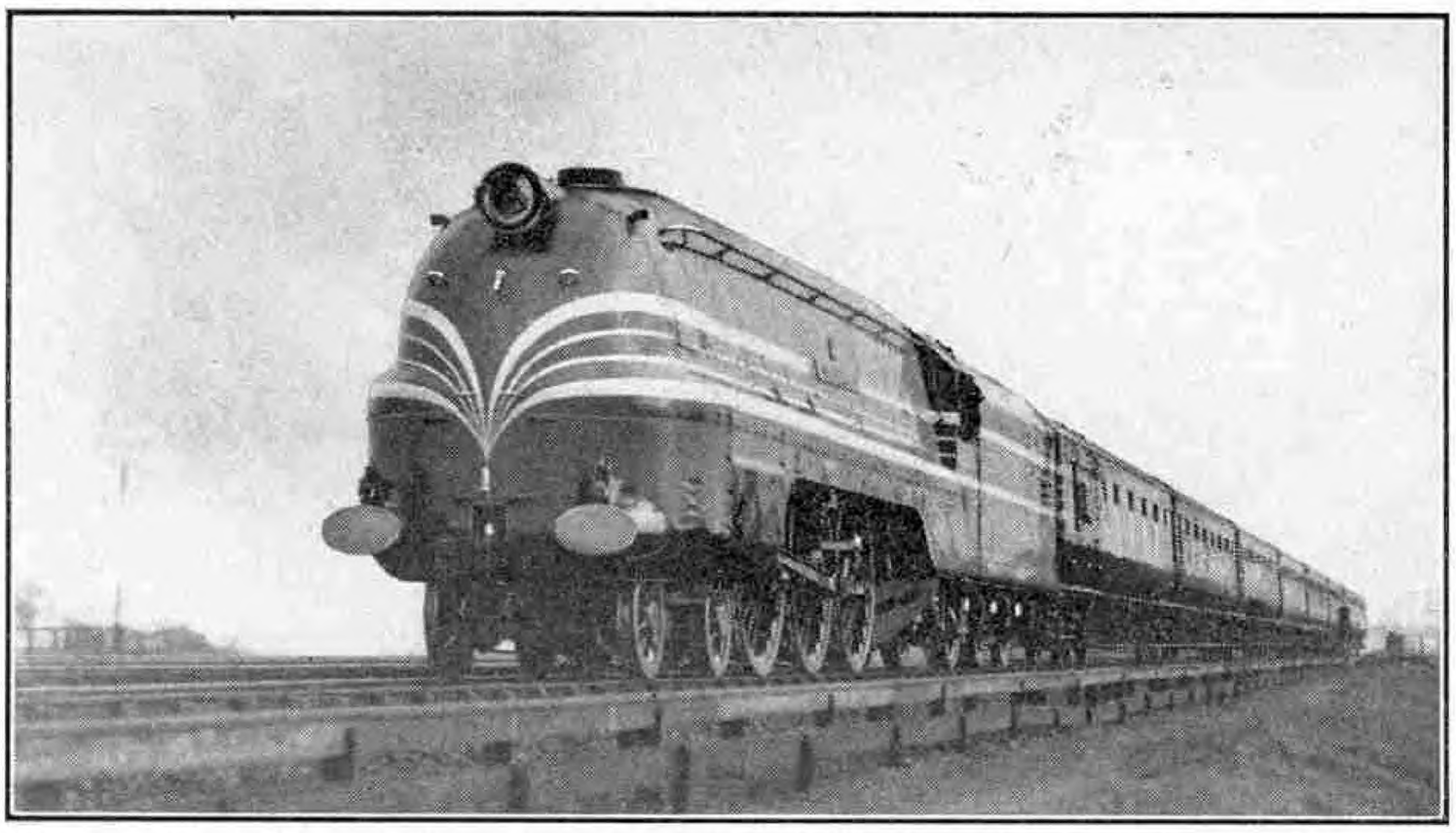
(*Continued on page 324*)

"The Coronation Scot" in the United States

Famous Train's 3,000-Mile Tour

THE principal British exhibit of railway interest at the New York World's Fair just opened is the new L.M.S. *"Coronation Scot"* train. This train is one of several intended for regular service later on, and was described in the *"M.M."* in February last. In the same issue we recorded the shipment of the train and its locomotive complete from Southampton Docks for Baltimore.

It is no light undertaking to arrange for the transport of a modern express train to the other side of the world, but the work was carried through without a hitch. For shipment from Southampton the train was necessarily run over the S.R., but the *"Coronation"* locomotive L.M.S. No. 6220 did not haul its own train and in fact was itself conveyed "dead" as a separate item. The transfer from L.M.S. to S.R. metals was carried out by way of Willesden, Kew and Hounslow, and S.R. locomotives were responsible for hauling first the vehicles composing the train, and then the locomotive, together with a wagon containing the necessary spares, down to Southampton Docks.



"The Coronation Scot" on a trial run before shipment to the United States. The train is now on exhibition at the New York World's Fair. Photograph by courtesy of the L.M.S.

A special length of track had been laid down to facilitate loading, and such is the efficiency of modern equipment that it took 7 min. only to lift the locomotive, swing it inboard and stow it in the hold. It is recorded that during this time not so much as a word was heard from those responsible for this part of the job! The vessel entrusted with this unusual cargo was the motor ship *"Belpamela,"* one of a number built for difficult tasks of this kind.

On arrival at Baltimore *"The Coronation Scot"* first enjoyed the hospitality of the shops of the Baltimore and Ohio Railroad, and then commenced a tour of 3,121 miles over eight different railroad systems before the commencement of the actual display of the train at the Fair. Among the systems concerned were the Baltimore and Ohio, over which a mileage of 375 was covered, and the Louisville and Nashville. The greatest distances travelled on any one railway were over the tracks of the well-known New York Central and Pennsylvania systems, on which 849 and 839 miles respectively were covered. In the course of the tour several important American cities were visited, including that great American railroad centre, Chicago.

An interesting feature of the visit to Chicago was the presentation to the engine of an American type locomotive whistle, which had been specially subscribed for by railway enthusiasts in the United States. It will be interesting for British enthusiasts to compare the deep tones of this with the sounds emitted by the ordinary British locomotive whistles. We have become familiar with the American locomotive "voice" through the medium of sound films, but to hear the real thing fitted to a British locomotive will be distinctly thrilling. The whistle will add distinction to the passage of No. 6220 when it again dashes through the English countryside.

The visit of the train, following on that of its relative *"The Royal Scot"* in 1933, has enabled Americans to see the progress made on the L.M.S. in locomotive and train design and equipment since that date. In this respect Americans are fortunate, for while a train such as *"The Coronation Scot"* can be operated without difficulty over their railways, it would be impossible, owing to loading gauge restrictions, for a typical United States train to be run over here. It will be recalled from the article describing the train previously referred to that to comply with American railway regulations a special headlight and bell had to be provided for this tour. In its present position, high up in front of the chimney, the bell could not be accommodated within the British loading gauge. That is why the bell is not shown in the illustration on this page—which was taken while the train was making a trial run prior to shipment—or on our cover.

The train has certainly aroused the interest of American railway men, and has already been described in the *"Louisville and Nashville Employees Magazine"* as "distinctive in design and styling, and quite different from its American counterparts." At the same time the regular schedule of *"The Coronation Scot"* in running the 400-odd miles between London and Glasgow in 6½ hr. is sufficiently good to be called "amazing," even in a country that claims the largest number of high-speed trains in the world.

For the tour the train consists of eight vehicles and includes a first-class sleeping car. In normal service no sleepers are run on *"The Coronation Scot,"* but the car is included to demonstrate how first-class travellers by night are catered for in this country.

A Spring Holiday in Sicily

By L. Hugh Newman



A gaily painted Sicilian cart. It is the fashion in Sicily to cover the panels of the woodwork with scenes chosen from Italian operas.

SICILY looks a long way from London on the map, but actually you can get there in two days, if you do not mind travelling all night. Personally I cannot sleep on trains, and so I took the journey in easy stages, spending a night in Paris, Turin, and Rome. In this way one can travel third class without any discomfort, and with the 60 per cent. off the fares that the Italian State Railways allow British tourists, the whole return journey can be done for well under £10, which is rather extraordinary when compared with the cost of travel in England.

I was glad I decided to cross Europe by day as there was so much to see through the carriage window. The first glimpse I had of Sicily was at sunset, at the end of the third day's journey. After flashing by orange groves most of the day I could not help thinking that the sinking sun vanishing behind the grey Sicilian hills looked just like a giant orange! We were in the land of volcanos, and Stromboli stood smoking like a dark blue cone rising out of a sea bluer than any Riviera picture post card I have ever seen. It was dark when we reached Villa San Giovanni, the harbour station on the "toe" of Italy. Sicily was now diamond studded with thousands of lights from Messina. As the ferry boat crossed the Straits the full moon over the mainland made a silver pathway across the narrow stretch of water. I was up on the top deck, and the air was as soft and warm as it is in England in June, though this was in the first week of February.

When I landed I found that I was to make the last part of my journey in one of the new "rapide" streamlined Italian motor trains. The engine started up and filled the carriage with fumes of crude oil; and then it spurted forward like no other train I have ever travelled in. For the next twenty minutes or so I clung to my seat, wondering when we should jump the rails. Soon we were going along at a tremendous speed—on one side white villas flashing by in the moonlight, on the other glimpses of rocks washed by the sea. The noise was dreadful, ten times worse than the noisiest underground train in London; the smell of burned oil was overpowering. I learned later that I was unlucky, as the trains only shake like this when they are nearly empty—with a full load they are beautifully smooth running. At last the train slowed down, and I heard the guard call out Taormina.

Taormina is a town with a personality all of its own, unlike some of the other coast towns like Catania, Palermo and Syracuse, which are much bigger and more cosmopolitan. It clings to the side of Mount Tauro over 600 ft. above the Ionian Sea and facing south-east is a perfect little pocket sun trap. But I think the chief reason why I picked on Taormina was because of the magnificent view of Mount Etna you get from here. This enormous snow-capped volcano completely dominates the landscape, and wherever you go in Taormina you see the glistening snowfields in the background against the vivid blue Italian sky.

Whenever I see a mountain I feel that I want to have a closer look at it, and it was not long before I had decided to get to know Etna better. It was a good 40 miles from Taormina, though it looked so close; and I had heard that a motor road had recently been built running right up to the snowline, so I decided to go by car.

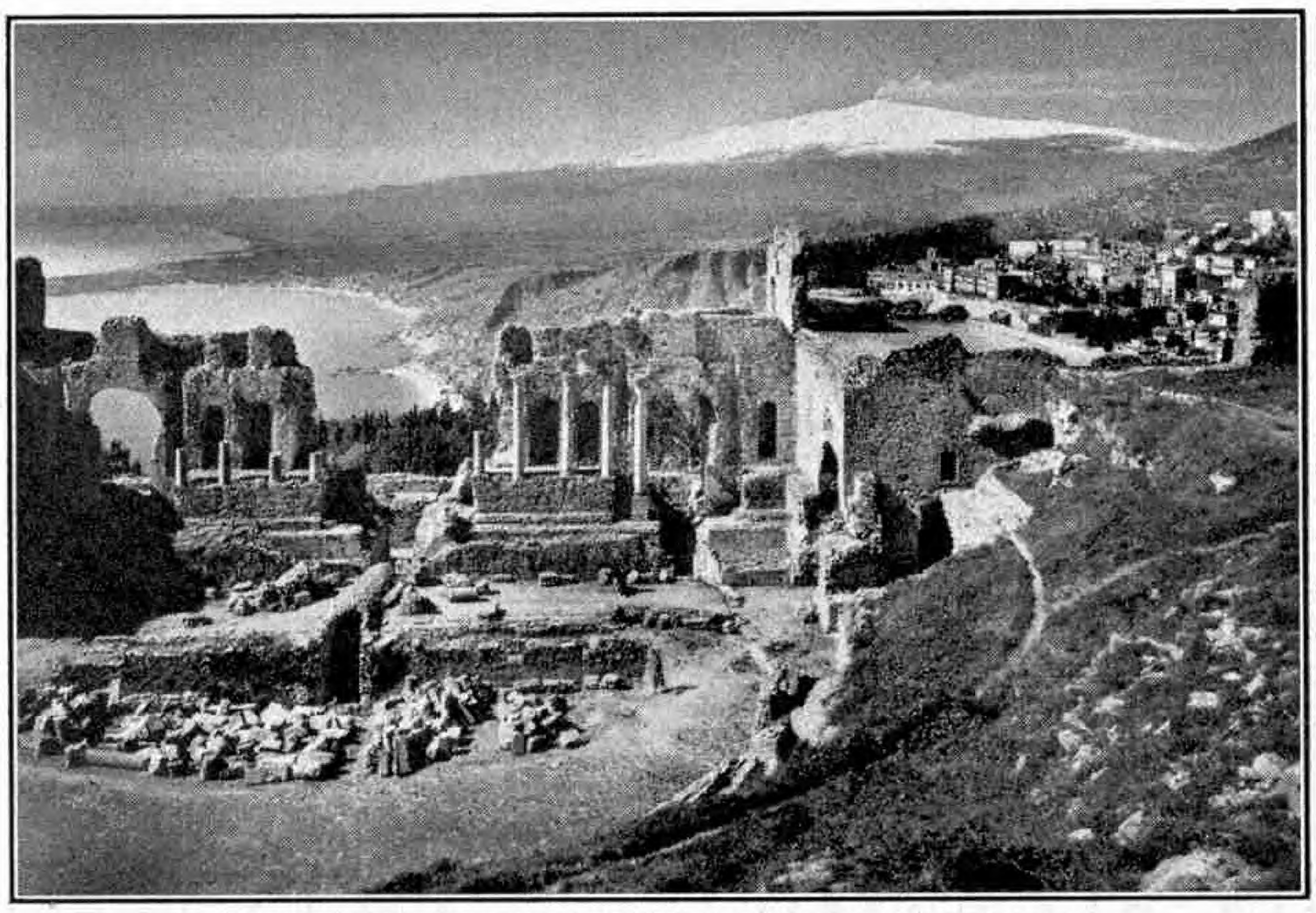
At first the road ran all the way along the coast through numerous little villages; and then, as we approached Catania, one of the largest seaport towns in Sicily, we began to climb the south side of Etna. Just outside the suburbs of Catania we passed through miles of vineyards planted in the black lava soil that is so wonderfully fertile. Higher up we came to one of the main petrified streams of lava, great rugged black blocks piled up on top of each other without a trace of vegetation anywhere. At one place we pulled up to watch miners quarrying the lava, which in the lower strata has been so compressed that it can be hewn out like blocks of granite.

On each side of this main stream the hills were beautifully wooded with sweet chestnuts, oaks not yet in leaf, and a species of gigantic broom. Just before we reached the snowline I noticed that quite a number of little modern villas had been recently built, obviously week-end resorts for the wealthier townsfolk in Catania. Stopping the car to take some photographs of the wide plains that stretch into the interior of the Island, I remember remarking on the warmth—it seems so much hotter than in the valley. Yet there was not a green leaf to be seen anywhere, while 3,000 ft. below almond trees were in full blossom and the fields were starred with thousands of wild flowers. At the time this struck me as rather curious.

The road wound higher and higher in a series of long hairpin bends, and at last patches of snow began to appear in the shady hollows. Soon our car was cutting through banks of snow three ft. deep on each side, and every moment it seemed to become hotter and hotter in the blinding sunshine! The road ended quite abruptly within about a thousand feet of the summit, and you could park your car comfortably and pay a visit to the "Etna Cafe" if you wished. There were crowds of young people ski-ing, mostly Italian and German youths; and some of the hardier ones even wore bathing dresses. I wished I had brought my skis from England, for then I could have written home to say that within three or four hours of bathing in the warm Ionian sea I had skied on Mount Etna at about 9,000 ft. above sea level, two entirely different sports in one morning.



A Sicilian and his son with strange musical instruments.



The ruined Greco-Roman theatre at Taormina with Etna in the background.

I had my lunch sitting on a block of lava that was sticking up above the snow. The view was magnificent. The interior of the Island was all blue and misty, with a river winding along far away like a silver cord. At this enormous height the sea did not look blue at all, but more like a sheet of burnished metal reflecting the sun; and of course the horizon was lost in the heat haze. I think this is the only time I have really felt that I was standing on top of the world.

I made several further motor tours during my stay in Sicily. One of the most interesting was to the north-west corner of the Island to see the wonderful temple at Segesta that still stands in lonely splendour, almost untouched by time, after thousands of years. It is said to be the most impressive example of Greek architecture in existence to-day, and is supposed to have been built in the fifth century B.C. I counted the immense columns and there were 36 of them, while the temple itself was over 200 ft. long. How they were constructed is as much a mystery as the building of the pyramids in Egypt. I saw also some of the ruined Greek theatres that are often hewn out of the rock on a hillside.

I found the best way to get a glimpse of the real Sicilian peasant life was not to travel by car, but to take a sandwich lunch and go out for the day on foot tramping the hills and valleys. All the little winding pathways down into the warm valleys are so steep and rough that no cart can possibly negotiate them. Instead you meet numerous donkeys all heavily loaded either with baskets of freshly picked oranges and lemons, or with long narrow barrels of fresh water, and sometimes enormous bundles of green fodder that almost hide the animals from view. Women pass in single file carrying baskets of laundry on their head, and I was amazed to see with what ease they balanced their burdens. Some of them even knitted as they walked down the stony pathway.

On one of my excursions I came upon a fast-running mountain stream at the bottom of a valley and found several women doing their weekly wash, standing bare footed in the icy water and scrubbing the clothes on a stone. Afterwards they draped them on the bushes near by to dry and bleach in the sun. I gave one woman a coin to pose for a photograph, and unfortunately a crowd of ragged little children spotted me. Up they came and started tumbling about in the dust, standing on their heads and turning somersaults just like circus clowns, and it cost me a good many lira before I could get rid of them. And then a funny old man came up to me and pointed to the little village on top of the hill and then at his donkey, saying: "Lovely donkey, to-morrow show you Castel Mola." He seemed so surprised when I made it clear that I preferred to walk.

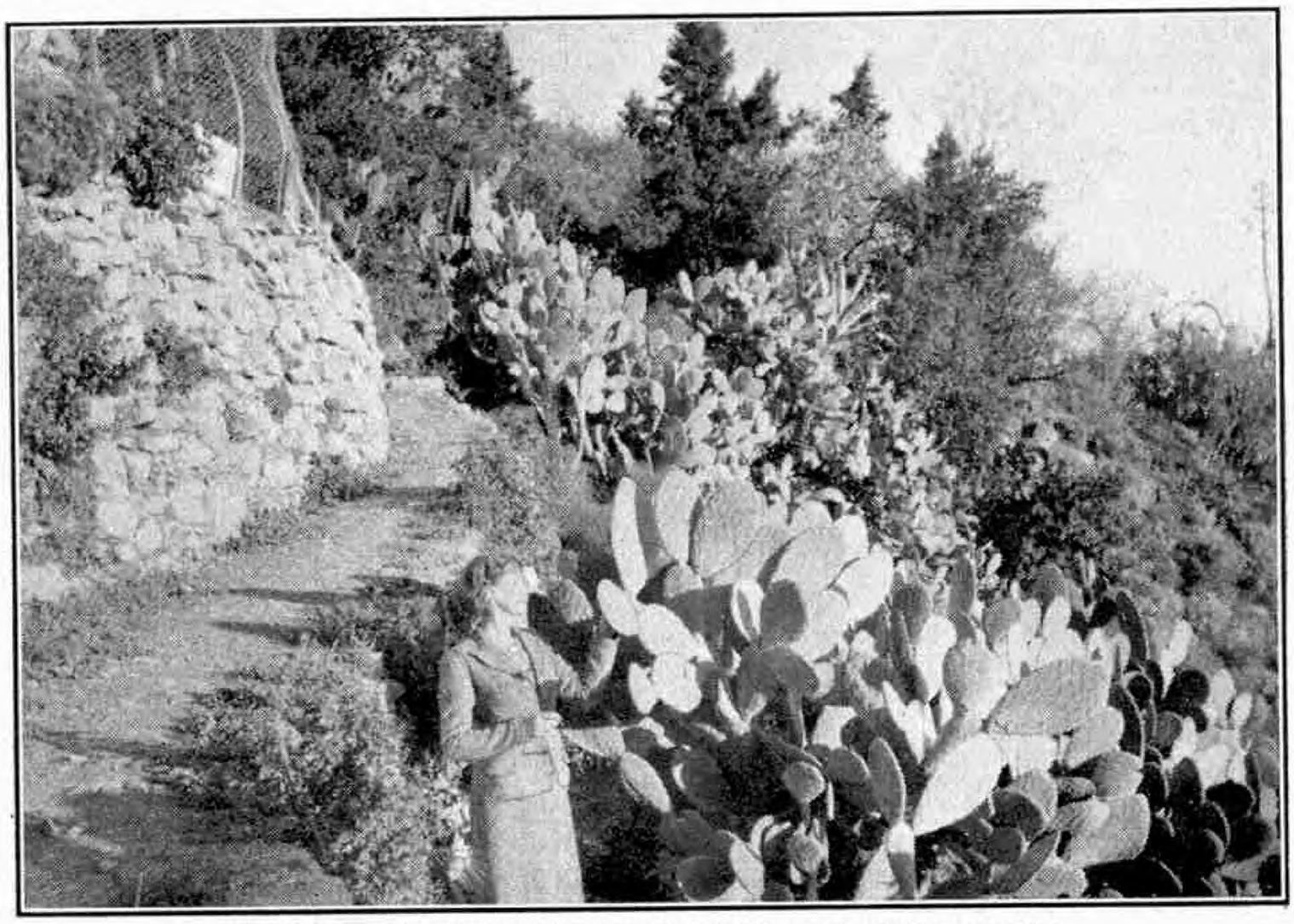
On the other side of the mountain stream there was an orange grove. Part of this stream had been led in artificial channels to water the trees. A small herd of speckled goats and a black pig were grazing in the orchard. Two girls were picking the fruit, and they handed me a twig with three oranges attached to it. Unfortunately these did not taste as nice as they looked, as they were very sour. Later I found out they were not really eating oranges at all; the pulp is squeezed out and only the skins are exported for candied peel.

I continued my walk over the next hill and passed through olive orchards and by trees full of lemons and tangerines. The fresh scent of the fruit and the flowers growing under the trees must have attracted all the butterflies in the district, as I saw swallow-tails, lovely orange and yellow cleopatra, pretty brown commas, and lots of humming bird hawks.

The small white and pink houses all had their terraced gardens well stocked with fennel and garlic and beds of globe artichokes. Higher up I came to the vineyards, where I was surprised to see a pair of milking cows harnessed to a very primitive wooden plough. On the ledges that were too narrow for the plough men were hacking up the soil round the little crooked vine stumps that had not yet started sprouting after the hard pruning.

I spent my evenings after dinner walking up and down the main street in Taormina, watching the people in the cafes. Often the quaint Sicilian music drew me inside, and I watched the young people dancing their national dance the Tarantella.

Not far from Taormina is the little village called Castel Mola. It is perched on the very top of a steep and rugged hill, and is a landmark for miles. I went up there by bus from Taormina one day, and though the actual distance is only about a mile and a half it took us quite half an hour. It was steep uphill all the way, and the road wound round and round in spirals and hairpin bends so many times that we motored about six miles instead of the mile-and-a-half of the footpath. In some places the road has been built on enormous arches spanning the gorges, and at times it made me feel quite giddy to look out of the window. Eventually we arrived at the village piazza, which is on the edge of a 200 ft. precipice. From here again the view was wonderful. In Taormina I felt I was pretty high up, but here I was actually looking down on it, and the house tops looked very far below me.



Prickly pear cactus, looking like giant Mickey Mouse ears, grows everywhere.

LITTLE GRAINS OF SAND

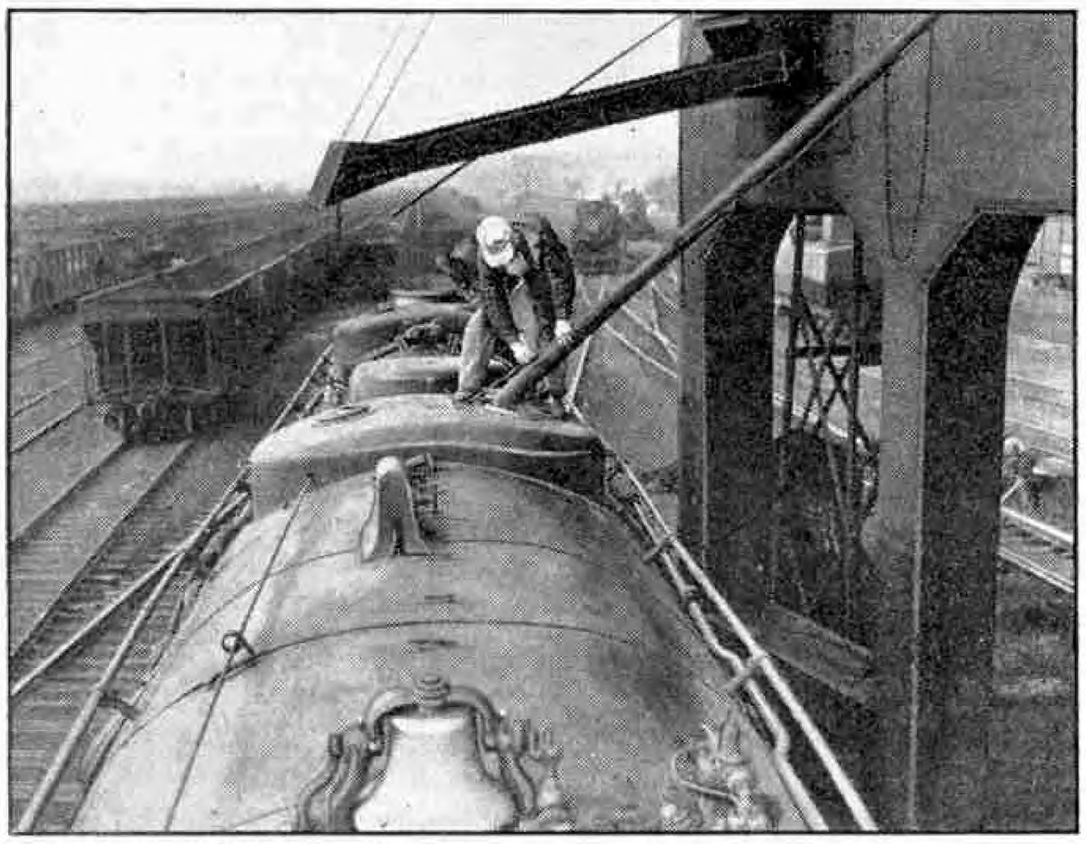
How They Help Locomotives To Pull Their Loads

By Harold T. Freed

IN her famous ode to little things, Julia Fletcher Carney has said:

"Little drops of water,
Little grains of sand,
Make the mighty ocean
And the pleasant land."

She could have written, as appropriately, that they help make locomotives pull their loads! Water and sand together have about



Filling one of the sand-boxes from the sand chute.

as much to do with propelling a railway engine as any two things, even as much as coal and grease. Without the water, the wheels would be motionless, without the sand they would often spin around ineffectually on the rails.

My youthful interest in little grains of sand was revived by a recent chat with an official of the Transportation Department of the Norfolk and Western Railway, who keeps a record of the sand used by the various engine terminals. "Did you know," he asked, "that Norfolk and Western engines required more than 30,000 tons of sand in 1937—or more than 80 tons a day?" I was amazed at these figures. Frankly, I would have guessed that the total amount would be nearer 80 lb. than 80 tons!

Friction is one of those things which is welcomed and even sought after in some phases of railway work, but despised and avoided in others. Long ago it was discovered that a few grains of sand between the driving wheels of an engine and rails would enable the rails to offer resistance to the motion of the wheels, permitting the latter to push themselves forward much as a man walks.

It is of vast importance to ensure sufficient traction between the rails and the wheels of a locomotive since the surface to be sanded is relatively small. Mechanical experts have calculated that while the total peripheral area of a locomotive driving wheel 70 inches in diameter, excluding the flange, is approximately 800 sq. in., the area of the wheel in contact with the rail at any one time is only about one-third of one square inch, or approximately the size of your thumb nail. It is in this small area, multiplied by perhaps six, eight or twelve driving wheels, that the entire tractive effort of the locomotive is concentrated; and unless the rails resist the motion of the wheels at these small but vital points the power of the engine may be dissipated, or when the brakes are applied the wheels will slide. Therefore railway locomotives are equipped with one or more devices so that with the touch of his hand the driver can deposit sand under the driving wheels, usually when starting, stopping or slowing down the train. At these times the need for friction is greatest.

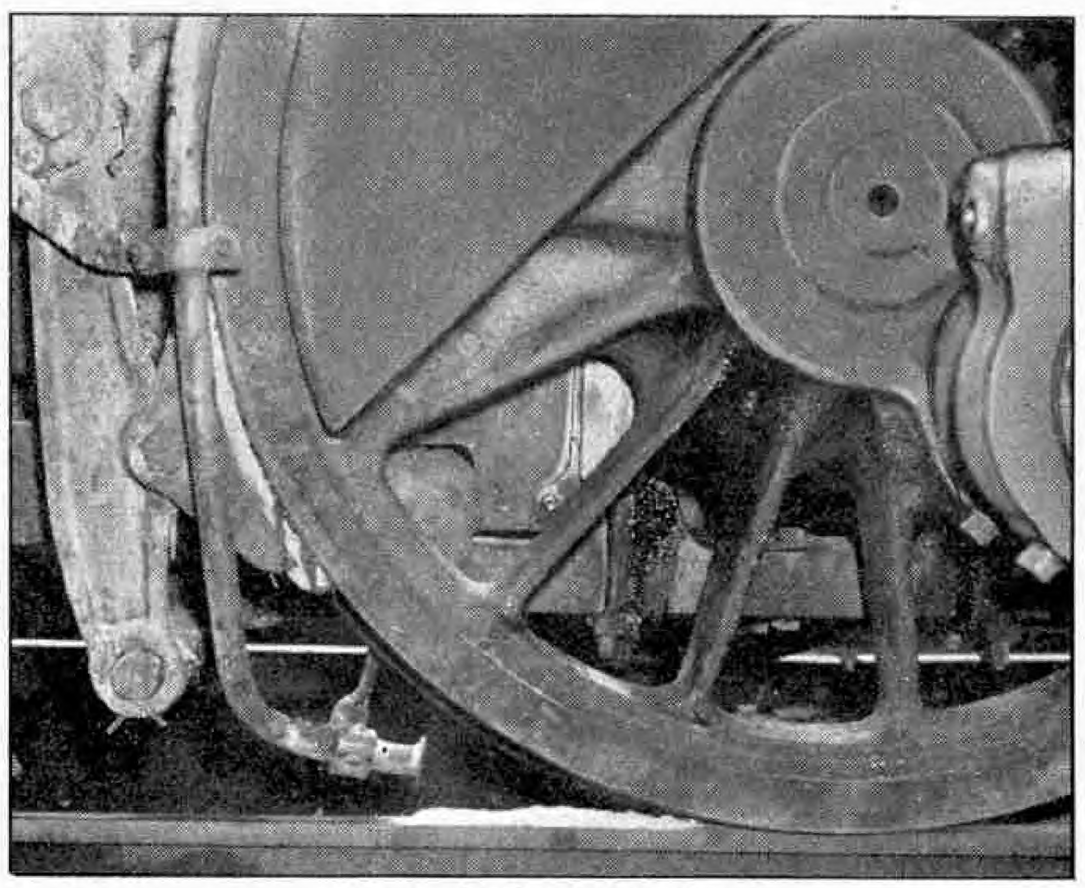
Between Cape Henry and Lynnhaven Inlet, near the Atlantic Ocean, are famous sand dunes, some 35 feet high. At a little station on the Norfolk Southern Railroad, appropriately named Sand Pit, from a supply estimated at a million tons, carload after carload of fine white sand is obtained for the Norfolk and Western and other railways. Sand also is supplied from pits located along the Big Sandy River at Fort Gay.

Before the Norfolk and Western accepted sand from either source for its engines, it subjected samples of the material to rigid tests. Much of the value of sand to a locomotive depends upon whether it will flow easily and quickly to the rails when needed, so the railway demands that it be finely-grained and relatively free from loam or other foreign substances. Sand with too much loam has been found to cake in the sand house and to become as hard as a clay saucer. To ensure the delivery of the proper grade of sand, the Norfolk and Western makes periodic tests of the material in its laboratories. One of these tests consists of packing a moist sample in a cylindrical mould and baking the sand thoroughly dry. Following the removal of the mould the sand, to be acceptable, must crumble without lumps by the application of slight pressure.

Since it is impracticable for the concerns who supply the sand to furnish it perfectly dry, the railway assumes the responsibility of eliminating the moisture content and of screening it before it is deposited in the locomotive sand-box. The sand is shipped in open-top high capacity wagons or "gondolas" and hopper vehicles. I paid a visit to the Shaffers Crossing coal wharf a little while ago to observe how the sand is handled; and while there I ventured into the compartment of the coal wharf where the material is dried and sifted. A minute or two in that oven-like place was enough for me!

The Norfolk and Western uses various devices to dry and clean the sand before transferring it to the locomotives. At some terminals the drying is done by a large stove; at others the moisture is removed by a network of steam pipes through which the sand drops when dry on to a cleaning screen. Usually after the drying and cleaning, the gritty substance is elevated by air pressure to a bin in the top of the coal wharf, whence it trickles, by gravity, through a pipe to the locomotive sand-box.

In the early days of railways the engines had no sand-boxes. Men spread sand on the rails by hand to keep the wheels of the "iron horse" from slipping. Later a wooden box was attached to the front end of the locomotive for the purpose of carrying a supply of sand along with the train. Finally, however, came the introduction of the rounded container mounted upon the top of the engine with pipes leading to the rails and it is the perfection of this system of using sand that we know at present.



How sand is deposited on the rail.

The modern sanding devices in use on Norfolk and Western locomotives are the direct outgrowth of inventions by three Norfolk and Western men, John G. Graham, W. H. White, and M. J. Fowler. The present devices, however, are greatly improved developments of the original inventions. A vital improvement which is incorporated in some Norfolk and Western locomotive sand-boxes is the "sand spreader," which from a touch of the driver's hand on a valve handle in the cab, moves the sand out of the cone shape in the centre of the sand-box over the outlets where it will be available for the next operation.

It is all done by compressed air moving through a system of valves, traps and pipes. If you will look at the upper illustration on this page you will see that the principal parts of the locomotive sanding system are first the sand-box, located on top of the boiler clothing or jacket; then come the pipes leading from the sand-box to the sand trap or sander. This is an L-shaped connection in the pipes carrying the compressed air from the locomotive air pump to the sand trap; and finally there are the pipes carrying the sand to the rail.

The operation of the system, I learned, is as follows: When the driver moves a valve handle in the cab a blast of air is forced into the pipe leading from the sand trap to the rails to clean out any sand which may have become lodged in this pipe. This blast is only momentary and is called the "cleaning blast." By a further movement of the handle this blast is followed by a continuous current of air into the sand trap, propelling the sand as it accumulates by gravity in the trap out and down into the pipe leading to the rails. The latter pipes are so curved on the lower ends that they place the deposit of sand directly at the point where the locomotive wheels are in contact with the rails.

The number of sand-boxes, traps and pipes carried by the different locomotives operated on the Norfolk and Western varies with the number of driving wheels and also with the type of locomotive. Engines of the Mallet articulated type, for instance, carry two sand-boxes, twelve sand traps and as many pipes; while the four-wheel passenger locomotives carry only one sand-box and two sanders.

The reason for the larger number of sanders on the freight locomotives is the prevailing heavier loads hauled by these engines, the slower speeds at which they operate and the consequently greater need for traction. In other words, when a locomotive operates at near its capacity power, as a freight engine frequently does, it is vitally necessary that each revolution of the drivers result in a contribution to the total tractive effort. There must be no wasted motion, and to prevent that possibility, the sand is made readily available to the various driving wheels.

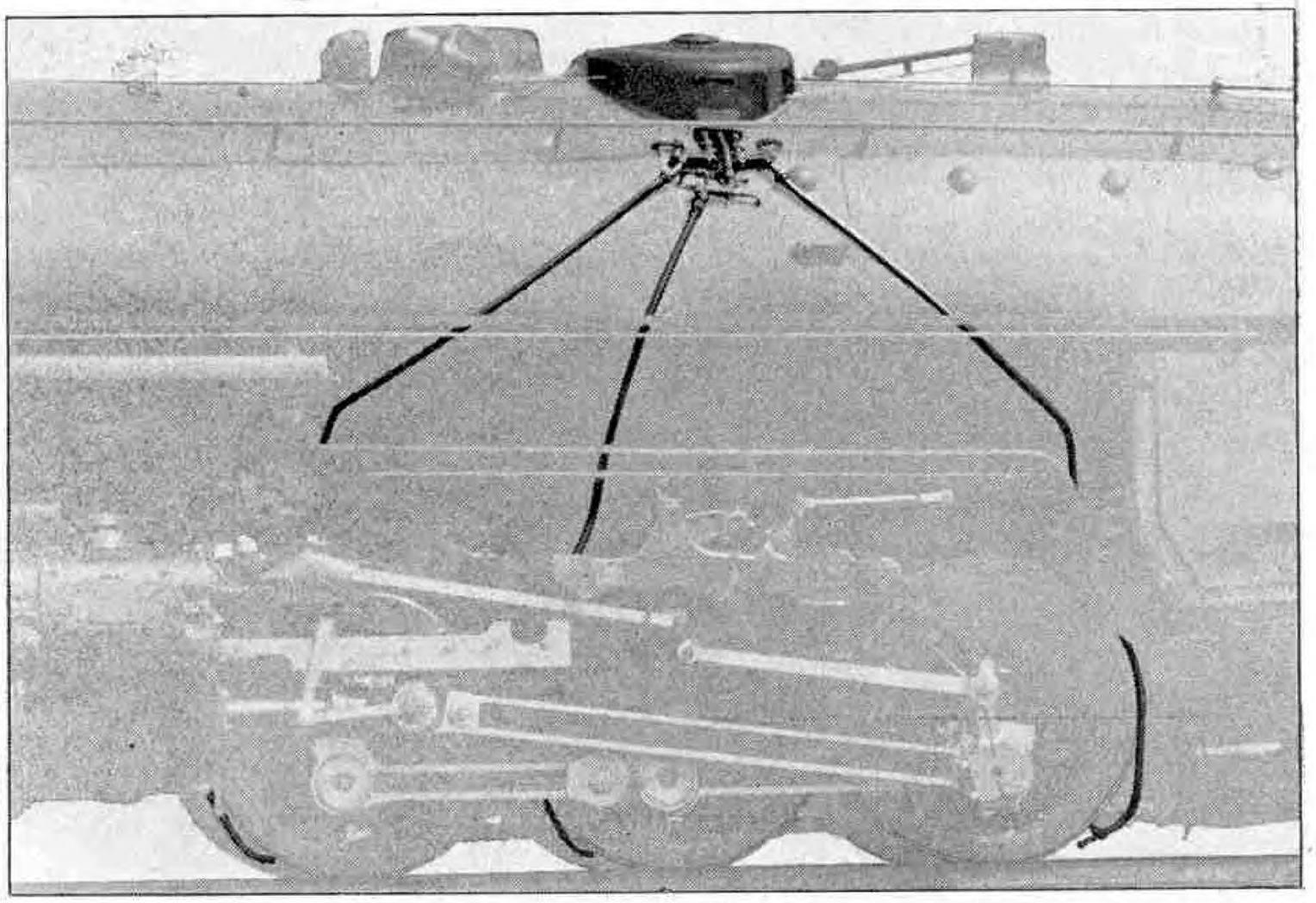
Another thing; I have often wondered why American locomotive designers put sand-boxes on top of the engine; so while I was inspecting the boxes at close range with General Foreman C. M. Pettrey, of Shaffers Crossing Shop, I inquired about it.

"They were put there because it's the best possible place for them," he replied. "You must keep in mind," he added, "that the sand, to be of any use, must be kept dry. In its position on top of the engines, the sand-box absorbs some of the heat from the boiler, and any moisture which the sand may have accumulated is driven out. In addition to this, the position of the sand-box provides good elevation so that the force of gravity may operate to the maximum extent in the system of pipes which conduct the sand to the rails."

"Why," I asked, "do the boxes have that peculiar shape?"

"The shape of the box has much to do with the flow of the sand. If the container were square, for instance, all of the sand would never leave it. The present design permits the sand to fall readily into the opening that carries it to the sand trap. Then there is another fact that you probably don't know. On most of our larger locomotives the boxes have two compartments with a division in the top parallel with the engine. This is to prevent the sand from packing on top and thus becoming unavailable for service." You will notice also that the depth of the box varies with the contour of the engine. This has been done to provide the proper clearance."

(This article is reproduced by courtesy of The Editor of the "Norfolk and Western Magazine." The author, Harold T. Freed, is one of the Assistant Editors of that journal.)



The sand distribution system on a Norfolk and Western locomotive.

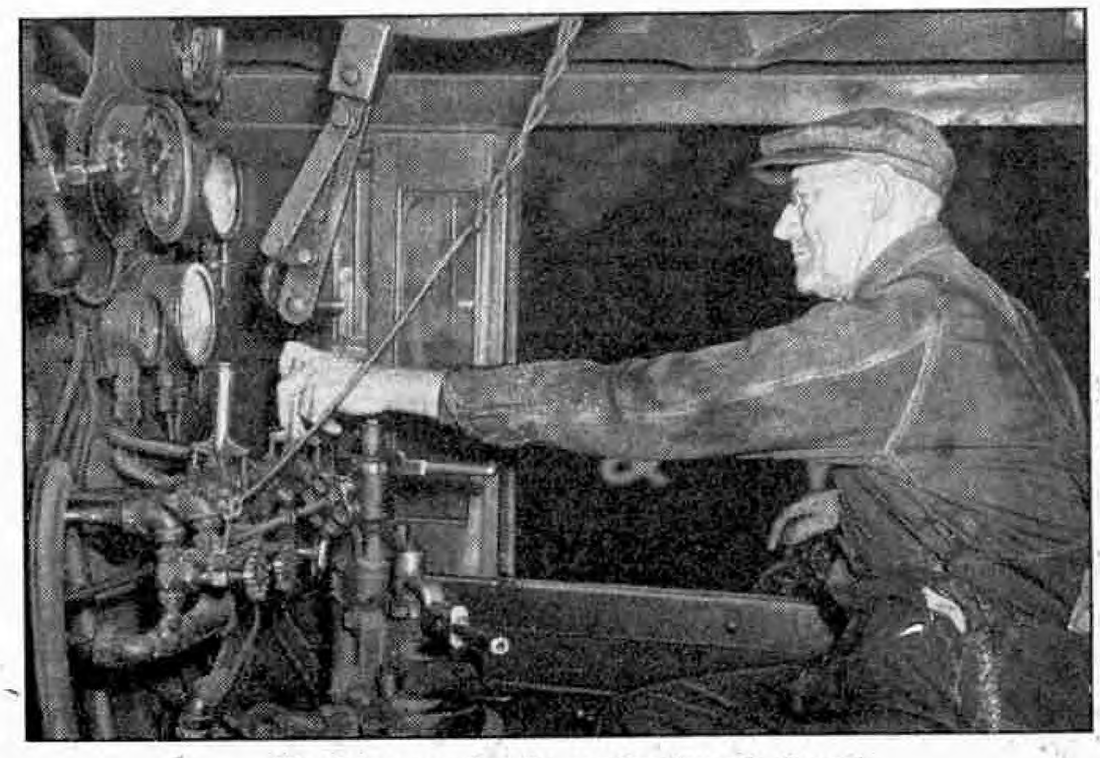
The foregoing article is of special interest to British readers as showing the difference between American and British practice.

In the first place, in British practice separate sand-boxes for each wheel to be sanded are placed either above or below the footplate of the engine. Sometimes when sand-boxes above the footplate are used they are combined with one of the driving wheel splashers. There have been instances of British locomotives carrying their sand-boxes on top of the boiler, notably the first 2-6-0s to run in Britain, which appeared in 1879 on the former Great Eastern Railway. Their general design incidentally included a number of American features.

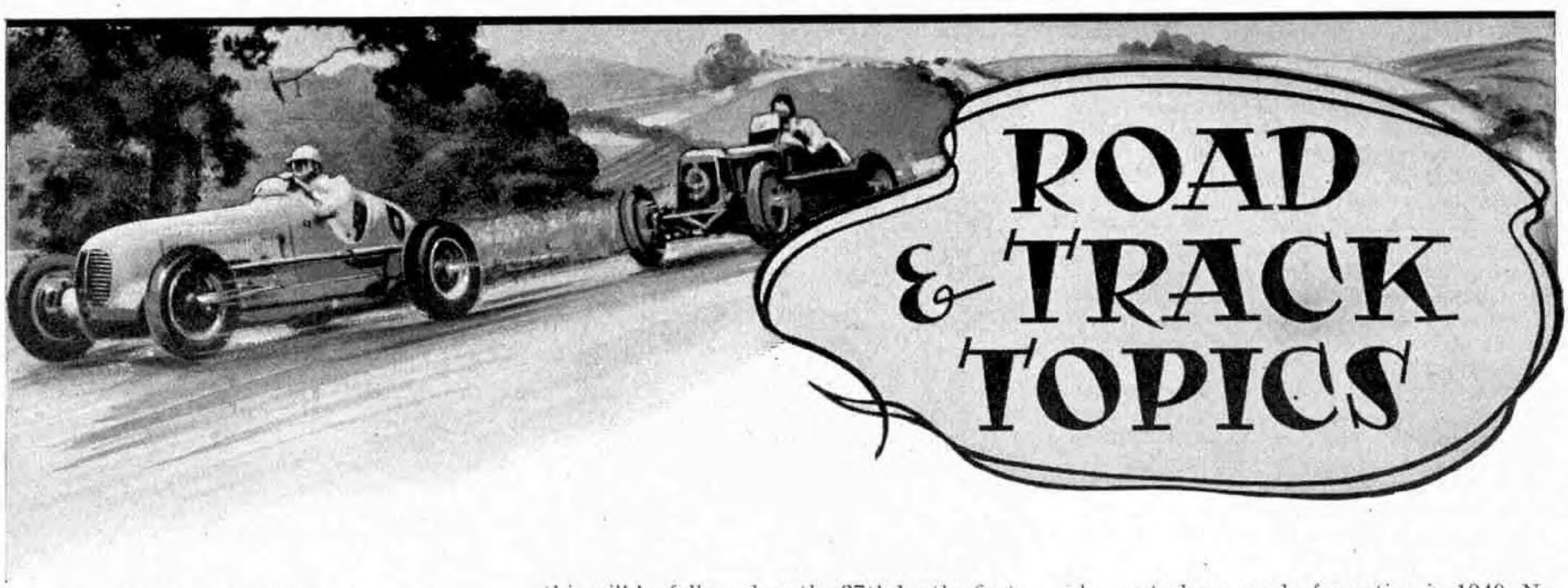
Although air is sometimes used as the medium for power sanding, steam is a favourite for the operation of auxiliaries on British locomotives. Steam sanding apparatus was first developed on the former Midland Railway many years ago, actually after experiments had been made with compressed air. One advantage of steam sanding is that, in addition to forcing the sand right under the wheels, it clears the rails of any grease that may be on them.

Many locomotives, particularly the older type, have nothing better than gravity sanding to rely on. In this system the sand is simply allowed to fall through pipes on to the rails when a valve is mechanically opened from the cab. It is a satisfactory system up to a point, but there is always the possibility of a strong side wind removing the sand from the rails before it has had time to be of any use.

A refinement in connection with locomotive sanding that has been provided on certain L.M.S. engines is a special arrangement which, by means of a jet of water, removes the sand from the rails after the passage of the driving wheels. This prevents the sand from interfering with track circuits, and no doubt to some extent it reduces the resistance to the passage of the wheels of the train.—*EDITOR.*



The driver moving the sanding lever in the cab.



The Start of The Racing Season

With the coming of May the motor racing season gets properly into its stride and from now until the end of October is to be a continuous programme of interesting events both in this country and on the Continent. Among the outstanding events arranged for this month are the International Trophy Race, which will take place at Brooklands on 6th, and the Tripoli Grand Prix, which will be run at Tripoli on 7th. The former is one of the most important events held at Brooklands, and this year motor racing enthusiasts are awaiting it with even more interest than usual, for it is expected that among the entrants will be one of four new E.R.A. cars that are now being completed at the maker's works. Last year the Trophy was won by P. McClure in a Riley, with an average speed for the distance of 204 miles of 84.36 m.p.h. R. Mays and N. G. Wilson, both of whom drove E.R.A.'s, were second and third respectively.

Another event for decision this month is the Antwerp Grand Prix on the 21st, and this will be followed on the 27th by the first of this year's Shelsley Walsh Hill Climbs. The record for this famous Hill was regained last September by Raymond Mays in his 2-litre E.R.A., his time for the climb being 37.86 seconds.

While it is unlikely that 1939 will see so many attempts to set up new speed records of various kinds as were made last year there is to be at least one challenger for the world's land speed record at present held by Captain G. E. T. Eyston with a speed of 357.5 m.p.h. This will be Mr. John Cobb, who if all goes well will make his attempt on the Bonneville Salt Flats, in the United States, in August. He will use the "*Railton*" that did so well in his attempts last September, and the giant car is already being overhauled and prepared for the task that lies before it. The great Napier engines by which it is propelled have been removed from the chassis and tests have been made with a view to obtaining even greater power from them.

Captain Eyston will not take his car "*Thunderbolt*" to America again this year as he is busy planning a new car that he hopes to have ready for action in 1940. No details of it are yet available, but it is believed that it will be lighter than "*Thunderbolt*" and probably will have six wheels, like its famous and successful predecessor.

The British Empire Trophy Race

The first important road race of the season, the British Empire Trophy of 200 miles, was won by a young ex-Etonian, A. P. Rolt, in an E.R.A. Seven other E.R.A.'s were included among the 19 starters, and Rolt's was not only the fastest but also one of the few machines that managed to complete the course without trouble. The car had been "tuned" for the race by F. W. Dixon, and its success was as much a testimony to Dixon's skill as to Rolt's good driving. Rolt led by 100 yds. at the end of the first lap, and he increased his lead steadily as the race went on, finally winning by two laps and 42 sec. from Hadley, who drove the Austin in which Charles Dodson won the event last year. This year Dodson drove a Maserati, and put up an excellent performance, but he ran into trouble near the end of the race. The cylinder head of his car had cracked during practice and had been hastily welded together. It held until near the end, but then failed altogether, and Dodson had to retire.

Novel Traffic Lights

One of the most interesting types of traffic lights so far introduced is installed at the Hague, Holland. The signal consists of a large circular disc on which are fitted 12 vacuum tube lamps, six of which are red while the other six are green.

When all six red rings are lighted traffic is stationary. As time passes, one ring after another is automatically extinguished, and when the last disappears the green tubes flash on and traffic moves. The six green rings then successively disappear and the cycle is repeated.

The special advantage of this system over the red, amber, green lights used in this country is that it allows traffic and pedestrians to judge the time during which a particular signal will operate. Motorists held up by the red lights see immediately when to prepare to move, and the pedestrian sees how much time remains for him to cross the junction. There is only one illuminated area instead of three, and there is no amber light to be abused by either pedestrians or vehicles. A somewhat



An impressive view of well-controlled motor traffic leaving Aintree racecourse, Liverpool, after the Grand National. Photograph, T. C. L. Hutchinson, Liverpool.

similar system of lights was recently demonstrated in Massachusetts, in the United States. In this case the signal consists of 15 white and one red bulb arranged in a circle.

A "Soap-Box" Derby at Donington

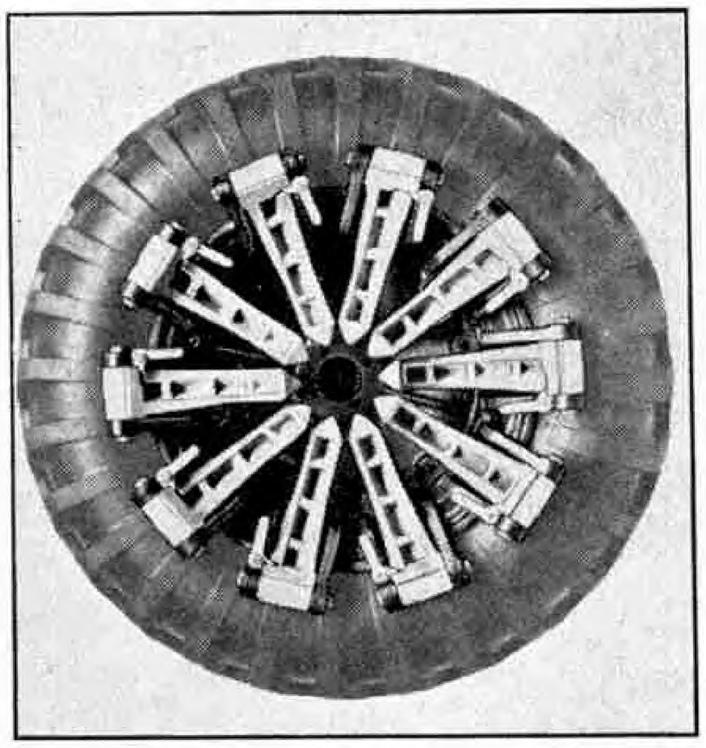
Small cars made by Boy Scouts will take part in a novel "Soap-Box" Derby to be held at Donington in June. The cars can be constructed to resemble any known racing cars, but to ensure that they may all have about the same speed, they must conform to certain specified rules and the cost of the material used must not exceed 50 shillings. Everything except the wheels, tyres, bearings, axles, steering wheels and steering column must be made by the competitors themselves, and no welding or soldering will be permitted in the construction. The wheels must not exceed 12 in. in diameter. Each car must be built entirely by the prospective driver himself, but he may receive advice from others regarding the design, and there will be separate classes arranged in accordance with the ages of the competitors.

This Year's "Road Star" Rules

The system to be used this year in allotting marks to British racing drivers competing for the two stars awarded by the British Racing Drivers' Association shows little change from that adopted last year. In formula races 15 points will be awarded to the winner, 12 to the second driver, and nine to the third. The fourth and fifth drivers will receive six and five points each respectively, and all others who finish the course will receive four points. It has also been decided that in future a driver must cover 85 per cent. of the total race distance in order to qualify as a finisher. The proportion formerly required was 80 per cent.

Motoring from New Zealand to London

A Mr. David Strang recently arrived in London from Auckland, New Zealand, after completing a journey by motor car of over 21,000 miles, most of which was over deserts, mountain tracks, bogs and some of the worst roads in the world. The journey was accomplished in a Humber Snipe. On the way he rescued a party of lost motorists in Australia, and encountered a rogue elephant and a pariah dog in Ceylon. He crossed India from its southern extremity to the Himalayan country, and then was well on his way across Afghanistan when he was turned back 1,500 miles because of widespread cholera. At one place where drinking water was very scarce he was charged a pound for a gallon of the fluid. Later he set off through Afghanistan once more and motored through Persia, the Syrian desert and Turkey on his way to Europe.



The Opperman "Quickgrip" wheel strake device in the "out of service" position. When in use the strakes encircle the tyre as shown in the illustration on the right. Photographs by courtesy of W. J. Reynolds(Motors) Ltd., Dagenham.

A striking feature of the journey was the performance of the car's tyres. Mr. Strang finished with the same four Dunlop Tyres and a spare with which he started, and only five punctures were experienced in the whole 21,000 miles of the trip. All of these were sustained in India. One was caused by a 6 in. nail dropped from a bullock cart and occurred in jungle country, where it was necessary to maintain a constant watch for leopards suspected to be lurking in the surrounding undergrowth.

Eight Million Miles of Service

During 1938 the road staff of the R.A.C. covered approximately eight million miles in patrolling the roads of England, Scotland, Wales and Northern Ireland. Most of this work was carried out on motor cycle combinations, but a number of small cars were also used.

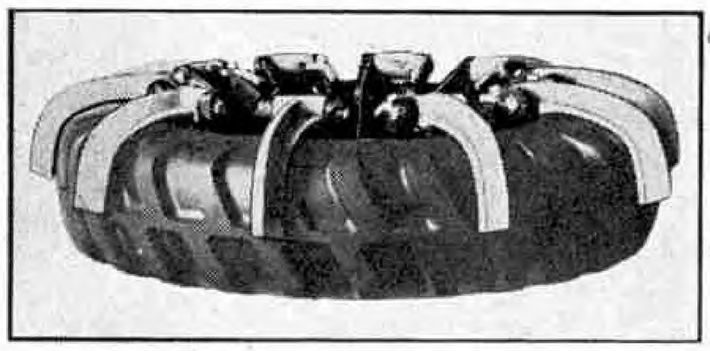
The average mileage travelled in a year by each of the motor cycle combinations is 18,000. Generally after covering 30,000 miles a complete engine overhaul is found necessary, and after 45,000 miles an entire mechanical, electrical and paintwork overhaul is given. Usually each combination travels about 100,000 miles before being withdrawn finally from service.

The cars cover an average annual mileage of about 30,000, and their useful life is approximately the same as that of the motor cycle combinations.

New Wheel Straking Device

The two upper illustrations on this page show an interesting wheel strake device known as the Opperman "Quickgrip," which has been designed for use with tractors equipped with pneumatic tyres. The purpose of the strakes is to enable the wheels to grip the ground firmly when the tractor is working on soft and muddy surfaces, and one of its special features is that its use does not appreciably increase the overall width of the wheel.

The device consists of 10 curved arms or strakes pivoted around a cast metal ring fitted to the wheel. When not in service the strakes are folded inwards, as shown in the illustration at the top of the page, and when required for use they are swung outward so as to encircle the tyre, as shown in the smaller illustration. They are then locked securely in position. No tools are required to bring the strakes into action and the

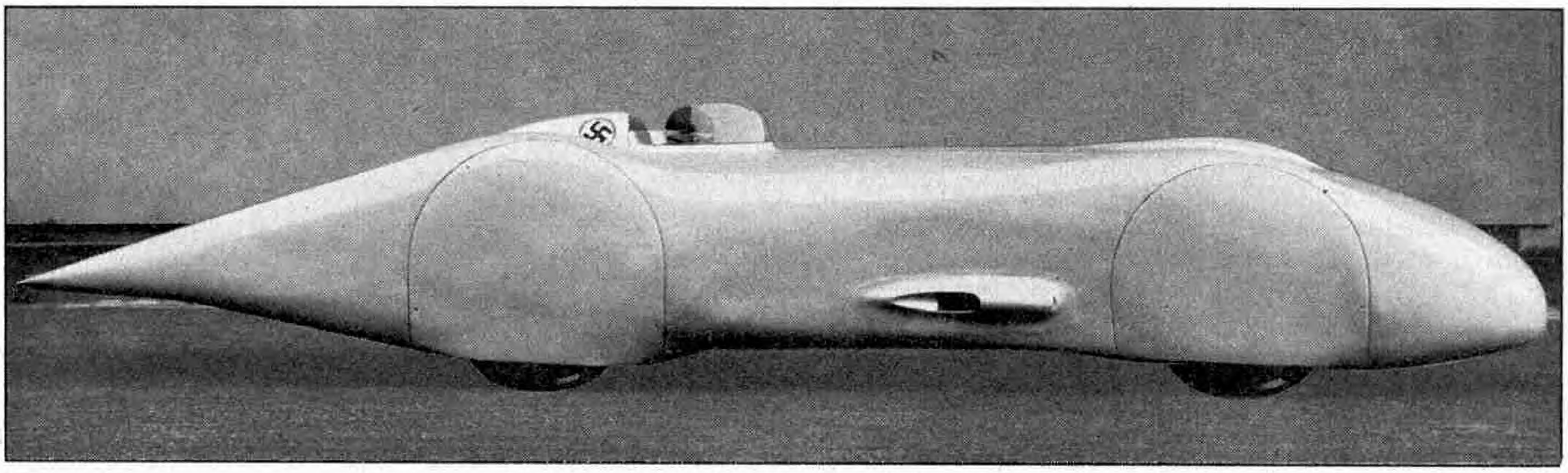


operation can be carried out in about three minutes. Thus a tractor that has been in use on the land can almost immediately be converted for travelling on the road or on any other surface on which the strakes would be undesirable.

Racing at Brooklands

The main event of the Brooklands Easter Meeting was the 23-miles scratch race for the Brooklands road championship, in which 11 of the fastest road-racing cars in Britain competed. A. C. Dobson, in Mr. Humphrey Cook's two-litre E.R.A., took the lead right off, and held it until the end, winning easily at an average speed of 73.27 m.p.h. Dobson incidentally broke the Class E record for the circuit by 4-4/5 sec., lapping in 1 min. 48 sec. at an average speed of 75.57 m.p.h. for one lap.

An exciting incident occurred during the third lap, when smoke was seen to pour from an Alta, driven by A. H. Beadle. The mishap was due to a broken oil pipe.



The fully streamlined 3-litre Mercedes-Benz, in which Caracciola, the German racing driver, set up several new class records at Dessau recently. His average speeds for the standing and flying mile were 123.49 m.p.h. and 248.13 m.p.h. respectively. Photograph by courtesy of Daimler-Benz A.G., Stuttgart.

The 74-Gun Ship "*Implacable*"

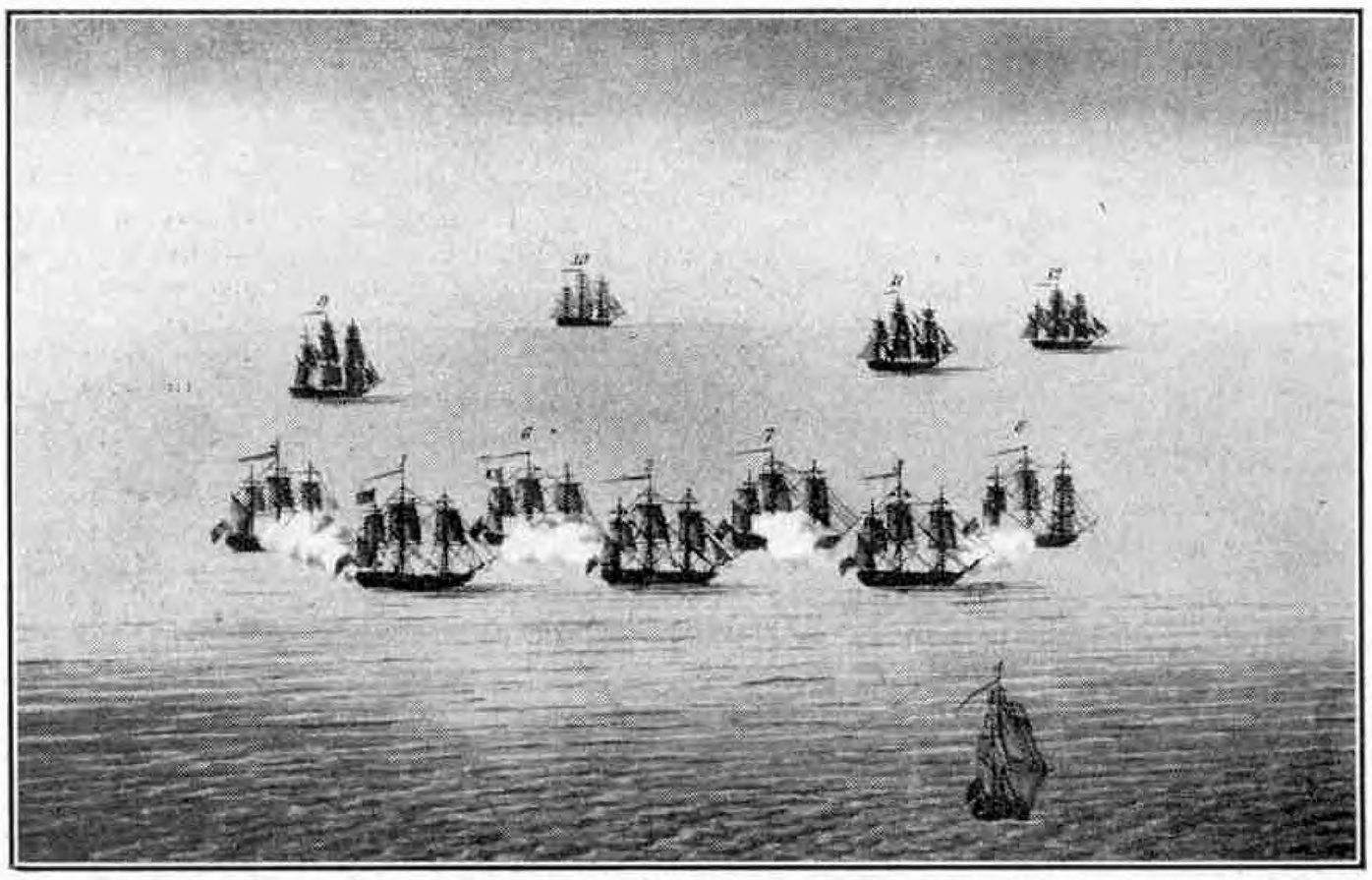
Sail Training for Modern Youth in Portsmouth Harbour

By Arthur Lamsley

ONE of the most interesting vessels to be seen in Portsmouth Harbour is the 74-gun ship "*Implacable*," the last of the prizes of Trafalgar times, which swings at anchor there and is still on duty. Although her fighting days are long over, she is doing unique service in offering a home afloat for cadets who wish to learn the lore of the sea and be trained in sail.

From June till September the "*Implacable*" gives accommodation to about 200 young men and boys for their period of training of from two weeks to two months, according to circumstances and the time that each can reasonably afford. When the old ship is fully restored to her original self, as the "*Victory*" has been, there will be room for about 300 cadets, and many of them will be able to come during the winter months as well.

Boys of about 12 years of age and upward can become cadets, and there is no age limit if one is willing to accept the discipline of the ship. University students will find here something new in the way of holidays, perhaps the cheapest and most romantic holiday in England. In addition to the training and living in one of the finest wooden ships ever built, another interest presents itself, for within a 25-mile radius they can study a miniature history of England at its ancient capital, Winchester, and one of its very earliest ports, Southampton. Living and training in this old ship costs only £1 per week.



The fight in the Bay of Biscay in which the "Duguay Trouin," later the "Implacable," was captured. The vessel is the left-hand one in the French line of four ships. This illustration is from a print in the possession of the Parker Gallery, 2, Albermarle Street, London, by whose courtesy it is reproduced.

The committee responsible for the upkeep and organisation of the "*Implacable*," and incidentally for the assembling of the much-needed funds from a ship-loving public for her restoration and preservation, have as their President Sir Owen Seaman. Colonel Harold Wyllie, son of the famous marine artist who in 1908 with Mr. G. Wheatly Cobb saved the ship for the nation, is the Superintendent.

A new cadet learns when he joins the "*Implacable*" that for the first time he is a member of a ship's company, and as such he takes a pride in his ship, is loyal to her, respects her property, and performs his duties smartly and cheerfully. Although he is on holiday, he enters willingly into the spirit of discipline, for a well-disciplined ship is a happy ship, and obeying rules is part of the essential training in seamanship and sail. On duty absolute silence is observed; instructions cannot be given in noise or confusion. Much of the discipline enforced is only that which one would have to observe in the skippering or crewing of any type of sailing craft. The cadet's day is from 6.30 a.m. till "Lights out" at 9.45 p.m., during which time he goes through the full daily life of a ship. The hours are a little shorter on Sundays, when cadets rise at 7 a.m.

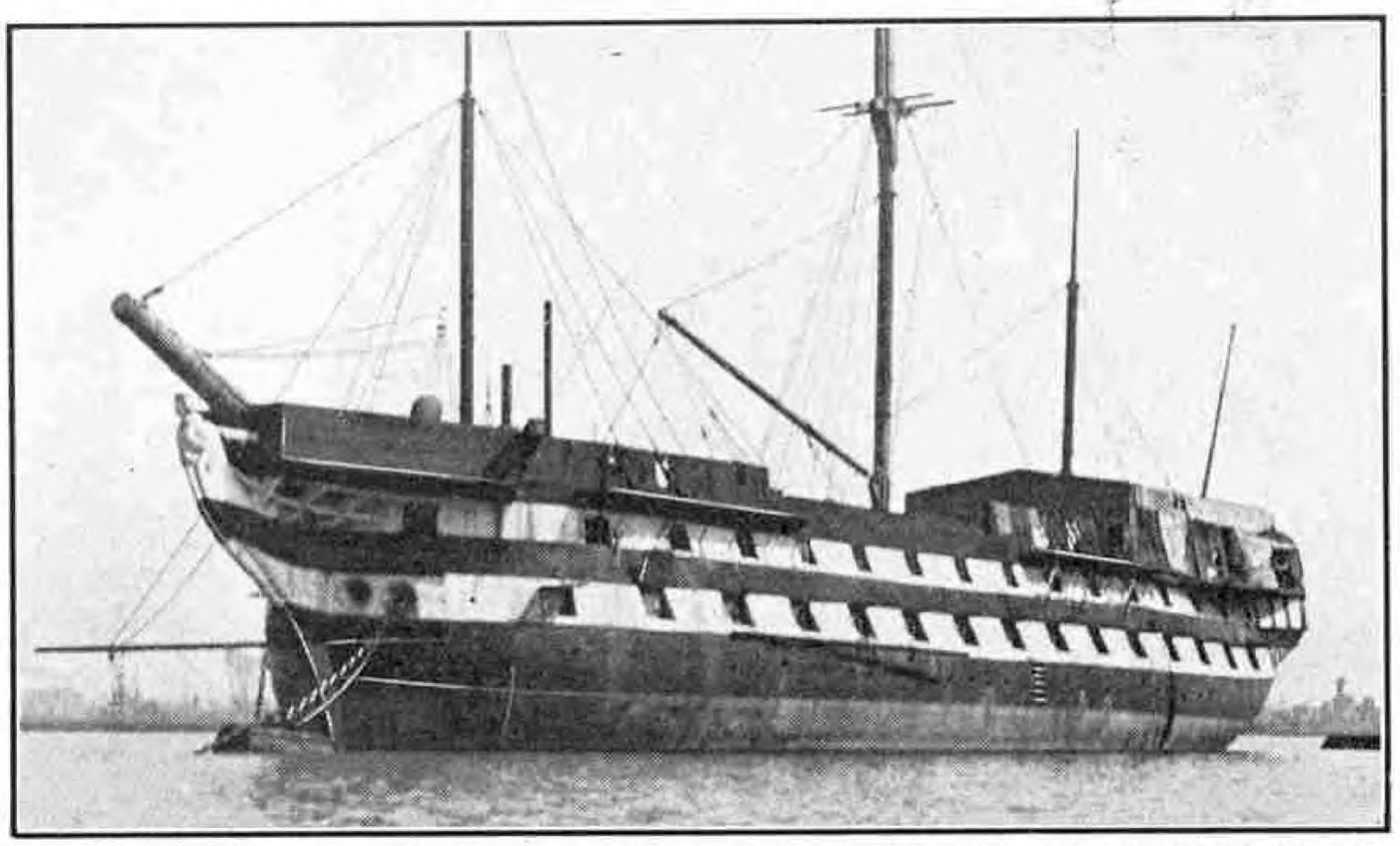
On joining the ship a cadet has his place allotted to him exactly as if he were a member of the crew, which indeed he is for the period of his holiday training. He has to be self-reliant as far as possible, and is helped in his various personal duties only through inspection every day. He is encouraged to be ship-shape before breakfast at 8 a.m., for it is most unlikely that he will have the time to get straight afterwards. From 9 a.m. to 11 a.m. he works at instruction, and then bathes and is taught swimming and life-saving. In the afternoon, from 1.30 p.m. till 8 p.m. he takes part in the many romantic expeditions organised by the Superintendent, such as visiting a battleship and Admiralty establishments, calling at places of interest on shore, and going through the entire Dockyard with its many sights, including that Mecca of all ship-lovers, the old "*Victory*." During the yacht-racing season in these waters the chance often occurs of watching very fine sport, and perhaps, for the older cadets, there is opportunity for a race as a member of a crew.

Colonel Harold Wyllie and his committee have drafted a most practical set of rules for those who use the ship's boats. The orders are based on the motto: "You can always tell a ship by her boats." Advice and injunctions are given concerning every possible kind of emergency in either sailing or rowing. While all mechanically-driven craft normally give way to sail or rowing boats, there are times in shallow or narrow waters when a very slight alteration of the helm of a fair-sized ship would put her ashore. In this case the cadet is taught to use his own initiative, and at all times to be a gentleman and give way to the larger sister ship.

Training is given also in how to work wind, tide, and fog, and instruction in the right way to deal with the situation with the least discomfort to the crew

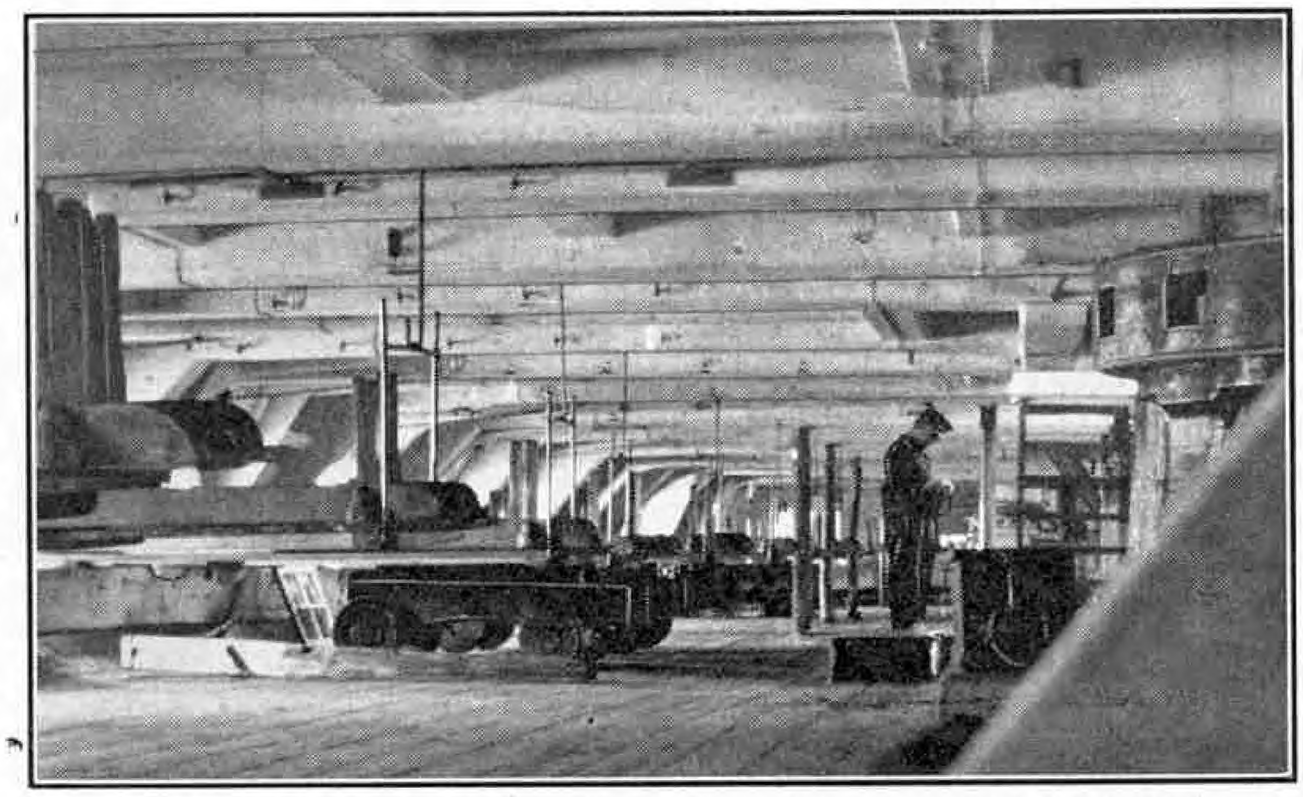
in the event of running on to mud banks, as might happen in the upper reaches of Portsmouth Harbour in foggy weather. Even the fact that seagulls rest on the water head to wind in a fog is not overlooked for the guidance of the cadets, and minute instructions are given on towing a boat with perfect safety to its occupants.

For practical training in sail the cadets use the *"Maid of Kent,"* a cutter that has won many a race in a rough sea, while those wishing to race small craft learn to handle the sailing dinghy *"Venture,"* designed by the late W. L. Wyllie and a winner of the Cooper-Rawson Cup in Southampton Water. The origin of the first of these sailing vessels is interesting. Mark Foy of Sydney challenged British yachtsmen to a match with his famous Sydney flyer *"Irex,"* and the late W. L. Wyllie had the *"Maid of Kent"* built to Linton-Hope's design, accepted the Australian's challenge, and in a series of races won splendidly. Yachtsmen also take cadets aboard their craft and give them practical work.



The "Implacable" in Portsmouth Harbour, where she is now moored and used for providing training in sail for boys and young men.

Quite apart from the education and invaluable training in general seamanship that the cadet gets aboard the *"Implacable"* from the excellent instructors, all ex-Naval War veterans, it is a wonderful inspiration to live for a few weeks in such a romantic ship and imbibe some of the cherished atmosphere of her many years of sea service. She was launched at Rochefort in 1800, and under the name *"Duguay Trouin"* formed part of Napoleon's navy. Five years later she fought at Trafalgar, where she formed part of the van, under Admiral Dumanoir, which sailed down the line in a vain attempt to restore the battle after Nelson had broken the French line. She escaped from the great fight with four other vessels under Dumanoir, and as their entrance to the Mediterranean Sea was barred by a British squadron they turned northward in the hope of reaching a French port in the Bay of Biscay.



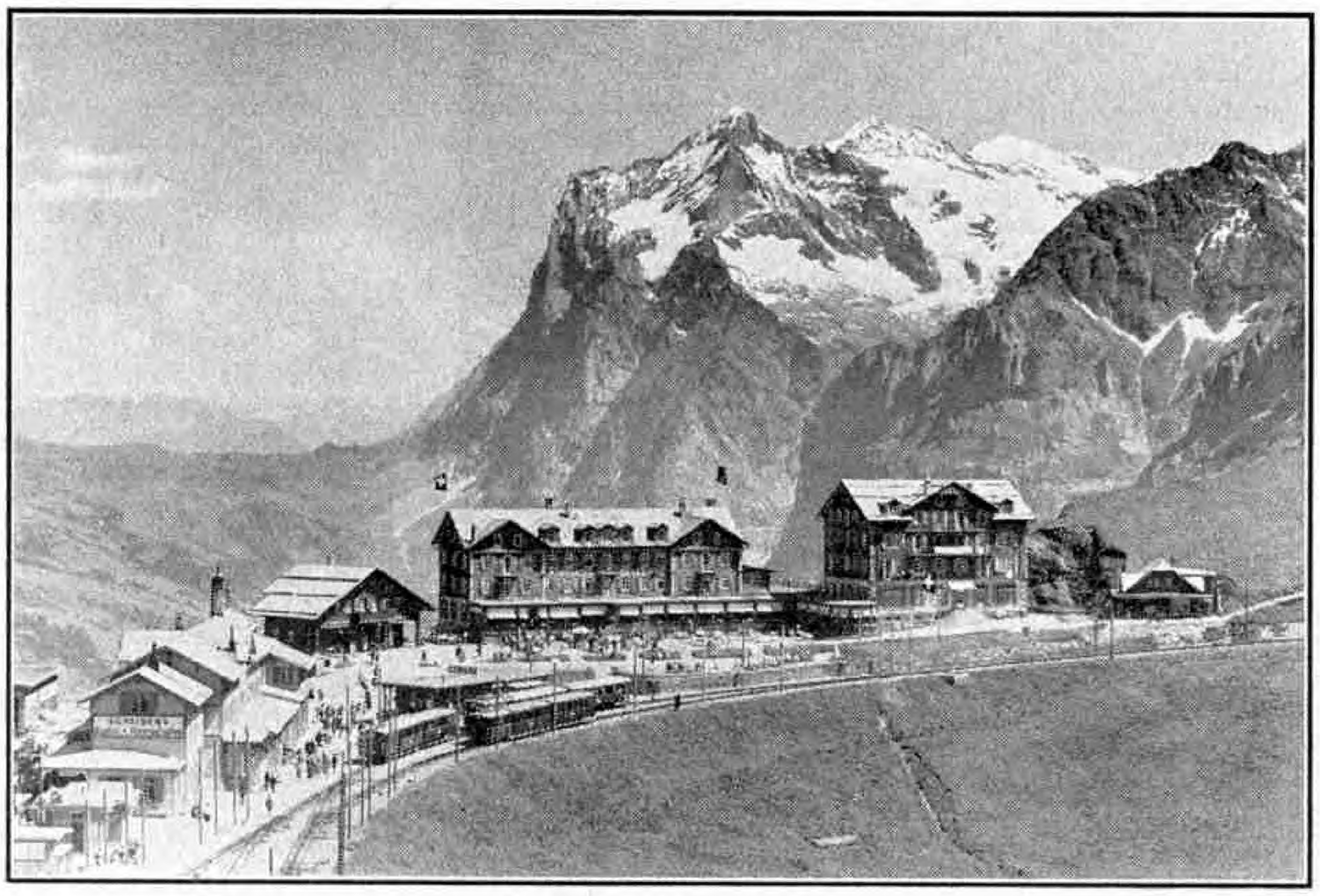
"Tween decks" in the "Implacable," the living quarters of the cadets undergoing training in this famous 74-gun ship of Trafalgar days.

In the Bay the French were seen and chased by a British squadron under Sir Richard Strachan. The English commander had only three of his five ships of the line with him when he came up with the enemy, but he attacked fiercely and there was a desperate fight that lasted for nearly three hours before a fourth British vessel came into action, when in little more than an hour the French ships surrendered. Two of them, the *"Formidable"* and the *"Mont Blanc,"* had only their foremasts standing by that time. All were added to the British Navy, and it was then that the *"Duguay Trouin"* received the name of *"Implacable."*

A remarkable feature of the fight was the prominent part taken by the British frigates, an unusual course for the light vessels of this class. Two of them made a spirited attack on the *"Scipion,"* the rear French ship, thus enabling Strachan to overtake the enemy, and eventually this French vessel was given the finishing stroke by the frigates.

The *"Implacable,"* under her original name of *"Duguay Trouin,"* distinguished herself considerably in this hardly-fought battle, which in a sense completed the work of Nelson at Trafalgar. She was the leading ship in the French line at the beginning of the battle, and therefore was farthest from the pursuers. She luffed up gallantly in order to rake with her fire the *"Caesar,"* the leading British ship, but the captain of that vessel saw the danger and avoided it by luffing also. Then the *"Duguay Trouin"* went about, either on purpose or by accident, and actually sailed down between the British and French lines, receiving a terribly destructive fire from the *"Caesar"* and other British vessels as she did so, particularly from the *"Hero,"* the second in the British line. The rest of the French vessels were ordered by Admiral Dumanoir to tack in succession to follow the *"Duguay Trouin,"* but the effort was in vain. In the action the British lost 135 men and the number killed on the French side was 730.

In her day the *"Implacable"* was a really beautiful ship, and her lines are almost perfect. When being towed from Falmouth to Portsmouth Harbour she averaged nine knots coming up Channel, and so wonderfully designed and balanced is she that, in spite of drawing 26 ft. of water, there were no speed waves and no towed waves. As Colonel Wyllie remarked, she is perfectly streamlined. Seamen of all ages will experience a quickening of the spirit when stepping aboard this "old wooden wall."



Little Scheidegg, 6,770 ft. above sea level, the starting point of the Jungfrau Railway. The Wetterhorn, which is over 12,000 ft. high towers in the background. Photograph by courtesy of the Swiss Federal Railways.

The Jungfrau Railway

By R. V. Hewitt

ON a sunny August day in 1893 Adolf Guyer-Zeller, a Zurich engineer, gazed upon a scene of incomparable beauty in the Bernese Oberland, Switzerland. As he admired the splendour of his Alpine surroundings he conceived a plan that ranks as one of the boldest in the history of railway engineering, for he thought of the Jungfrau Railway, the highest in Europe, which tunnels for almost the whole of its length beneath two Alpine peaks and took fourteen years to build.

Guyer-Zeller was spending his holiday at Mürren, a famous Alpine resort, and he had climbed the Schilthorn with his daughter. As he descended his gaze returned again and again to the mighty Jungfrau, Queen of the Alps, the symmetry and pure whiteness of whose peak is one of the most memorable sights in the world. His eye caught the smoke rising from a train on the recently-opened Wengernalp Railway, and as he watched the train slowly ascending to the Little Scheidegg he thought: "From the Little Scheidegg a railway could be run to the Jungfrau." That same night, full of enthusiasm for the project, the Zurich engineer returned to Mürren and drafted out a rough plan for his dream railway. That first scheme remained the basic plan for the Jungfrau Railway when it was constructed.

Others before Guyer-Zeller had considered the practicability of constructing a railway to the summit of the Jungfrau, which is 13,670 ft. above sea level. Guyer-Zeller proposed to begin the building of his railway at the Little Scheidegg. This is the watershed of the White Lütschine and the Black Lütschine, two tumbling mountain torrents, and stands at an altitude of 6,772 ft., above the tree-line. Lush meadows, transformed in spring into carpets of flowers, lead down to the valleys far below. In the valley to the east lies the village of Grindelwald, well known to English visitors; and on the western side is the steep Lauterbrunnen Valley, home of innumerable springs, cascades, and cataracts. The Wengernalp Railway, which was opened in June 1893, links Grindelwald and Lauterbrunnen, running over the Little Scheidegg by way of Wengen and the Wengernalp. The glaciers and snow slopes stretch down from the great peaks towards the Little Scheidegg, which was thus the natural starting-point for the Jungfrau Railway, connected as it was with the outside world.

Guyer-Zeller's plan was that the railway should traverse the mountain pastures to the Eiger Glacier and then should tunnel beneath the Eiger and the Mönch, two peaks 13,038 ft. and 13,467 ft. high respectively, to the Jungfraujoch, 11,340 ft. This meant that a tunnel five miles in length had to be blasted through solid rock to an altitude of about two miles above sea level. That tunnel is higher than any other in the world.

The first part of the railway presented few difficulties to the engineers of a country possessing countless mountain railways, which are often alarmingly steep and tortuous. The line is carried along the summit of a ridge, across Alpine pasture grounds, with magnificent views of the Eiger, Mönch, and Jungfrau above, with Mürren and the deep Lauterbrunnen Valley to the right, and the Wetterhorn, the Faulhorn group, and Grindelwald to the left. It was necessary to construct a short tunnel 285 ft. long in one place, but for the remainder of the way to the Eiger Glacier Station the ascent was easy, with few complications. The distance from the Little Scheidegg is 1½ miles, and the line ascends almost 1,000 ft. in that distance.

The pretty little Eiger Glacier Station is overshadowed by the vast bulk of the glacier, which is farther away than it at first appears. The great tunnel begins 656 ft. beyond. Nature came to the assistance of the engineers in their Herculean task for, by a happy combination of circumstances, the rock was found to be very suitable for tunnelling. It is a mountain limestone, so hard that it was unnecessary to strengthen the walls of the tunnel with bricks or masonry; but to the usual difficulties and problems facing engineers in driving tunnels was added the strain imposed on the workmen by sustained work at the great altitude. Ventilation also was a problem, especially towards the farther end of the tunnel.

As far as Eismeer Station, which is a little over 3½ miles from the Little Scheidegg, the tunnelling was accomplished successfully with electric rock drills. The last section of the railway to Jungfraujoch passes through harder rock, and there Ingersoll pneumatic drills were used.

The tunnel is lit by electricity throughout its entire length, and the stations bear large illuminated signs. For most passengers the tedium of the journey through the tunnel is relieved by a welcome sleepiness, so that the time seems to pass rapidly between each station.

The train arrives at Eigerwand, the first station on the railway hewn out of the rock, 17 min. after leaving the glacier station. Eigerwand is at an altitude of 9,405 ft. and was opened for traffic on 18th June 1903. Three huge windows, 18 ft. wide and about 10 ft. high, have been cut into the side of the cliff face on the north side, and through the thick glass passengers, who are always given time to alight, are confronted with a panorama so vast and awe-inspiring that it is almost incredible to those unacquainted with the mountain scene. The view includes the mountain ranges of Central and Northern Switzerland, extending, when the visibility is good, as far as the Jura Mountains, the Black Forest in Germany, and the Vosges Mountains in France. These windows lead off from the platform in the tunnel. The station itself is reached from the railway by means of a lateral heading 26¼ ft. long and 18 ft. wide. It is hewn from the rock, and the roof is supported by pillars of solid rock that measure from nearly 10 ft. to over 16 ft. in circumference.

One mile from Eigerwand is the next station, Eismeer. Leaving Eigerwand the line curves into the interior of the Eiger, passing from the south-east side to the north slope of the mountain. The line curves at a radius of 656.2 ft. between Eigerwand and Eismeer, which is reached in 10 minutes. Here again a short heading leads to the station itself, which was opened on 15th July 1905, two years after Eigerwand, and is a wonderful tribute to the skill of the engineers who carried out the blasting work. A panelled restaurant hewn from the rock, with fanciful inscriptions, was their tour de force. From the windows are views of the wildest, most romantic Alpine scenery. Many of the greatest peaks of the Bernese Oberland can be seen as only the mountaineer is privileged to see them, rising above crevassed glaciers, 20 of which can be seen from the Eismeer windows.

We now come to the last section of the line which, for close on two miles after leaving Eismeer Station, has a much more gentle gradient than the lower part. The maximum gradient is about 1 in 16, and the use of cog rails is not necessary, so that this is known as the adhesion section of the line. The average speed on it is about 11 m.p.h. Passing in a straight line immediately beneath the summit of the Mönch, the

track ascends more steeply towards the end, where the maximum gradient reaches 1 in 4, and a return to the rack-and-pinion type of track is necessary.

This portion of the line caused the engineers the greatest anxiety. The rock here is gneiss, which is similar in characteristics to granite, and is much harder than mountain limestone. The work of excavation between Eismeer and Jungfraujoch, a distance of 2½ miles, occupied 4½ years, although it was continued day and night. One of the problems facing the engineers was the time taken in transporting the excavated rock from the working. To expedite this removal and to assist the ventilation they decided to construct a lateral adit, about two miles beyond Eismeer Station, on the south-west side of the Mönch, at an altitude of 10,955 ft. In later years the opening was turned to useful purpose by the installation of a powerful searchlight, of 96 million candle-power, the beam of which on clear summer nights can be seen far beyond Berne, about 40 miles distant.

Jungfraujoch Station, 5¾ miles from the Little Scheidegg, is different in construction from the other tunnel stations. The tunnel broadens out for the double line and the platforms, as it does at Eismeer, but the station buildings are not hewn out of the rock. Instead they are incorporated in the Berghaus, which is built on a precipitous ledge on the mountain side. The Berghaus is the highest hotel in Europe. It is built in typical Alpine style, with chalet-like roof, and contains spacious waiting rooms and restaurants. When viewed from the snow plateau of the Jungfraujoch it seems to grow out of the cliff, and its construction was a remarkable feat of engineering, particularly when it is remembered that all the materials to build it had to be transported over 11,000 ft. from the valleys below.

Passengers leaving the train and entering the Berghaus come first to the booking office, adjoining which is a post office equipped with full telephone and telegraph services. There is a particular thrill in sending a letter or card bearing the Jungfraujoch post mark to indicate that they are sent from the upper terminus of Europe's highest railway.

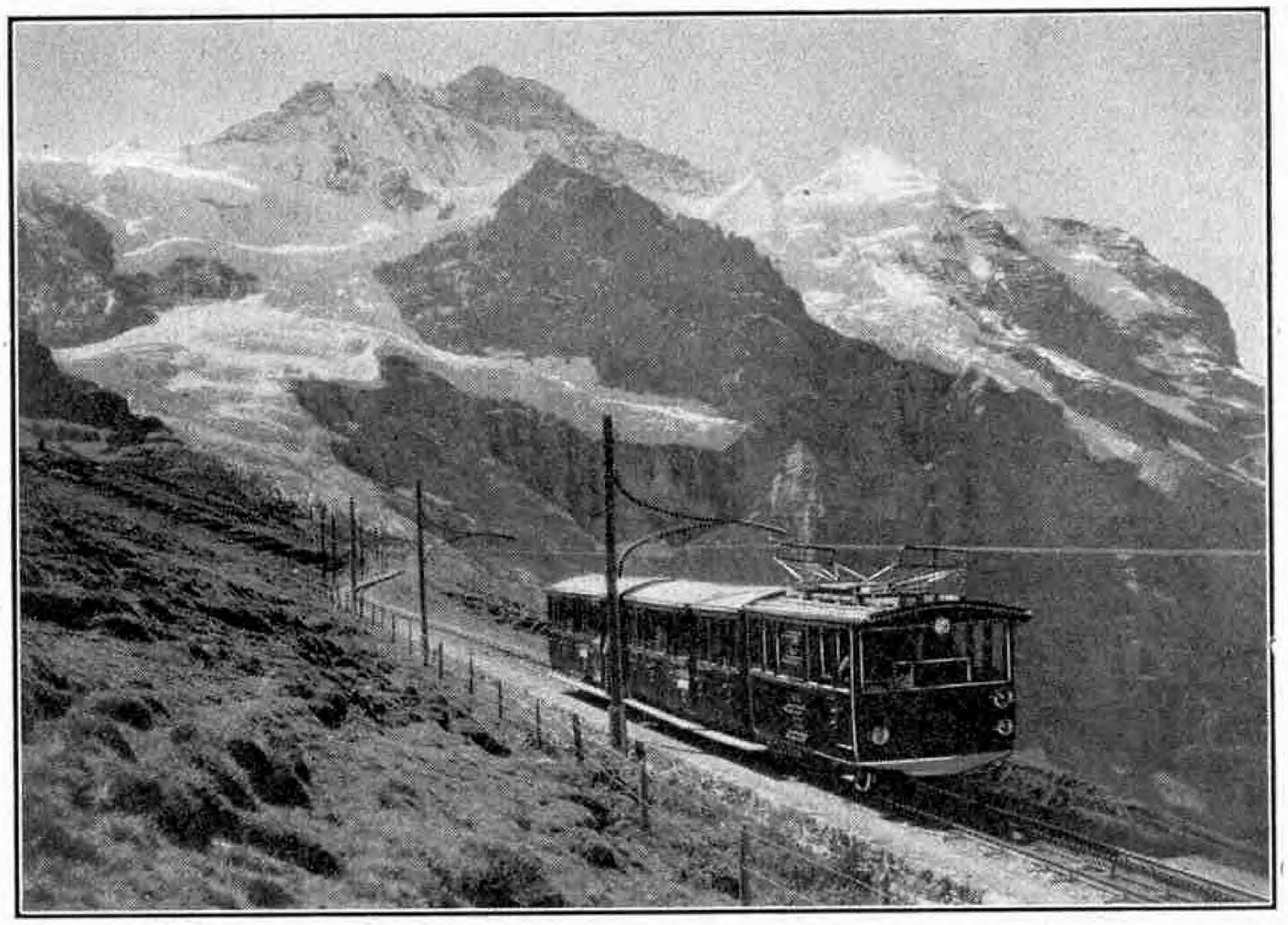
Jungfraujoch is a favourite base for climbing. Before the railway was built mountaineers had two days of wearisome climbing with full kit before they were within striking distance of the high peaks. Now they board the train at the Little Scheidegg, and in a little over an hour have the choice of five peaks over 13,000 ft. high. So near are the Jungfrau and Mönch that each can be climbed in about three hours.

The one disadvantage of this method of attack is that the railway does not give sufficient time for acclimatization. The climber finds himself transported to a high altitude in such a short time that his body, particularly his heart, does not become accustomed to the new conditions. Any violent exercise at such an altitude is very fatiguing, and even dangerous, to those with weak hearts, until acclimatization has taken place. Many ordinary travellers find that the altitude affects them adversely at first, but they soon recover.

Ski-ing is another sport that can be enjoyed in the ideal conditions of Jungfraujoch, even in the middle of summer. The world's most famous ski-runners meet there for the annual ski races in July, when there are usually as many as 100 entries. The long run down the Aletsch Glacier from Jungfraujoch to Concordiaplatz is perfect, and jumping competitions are held from the Glacier jumping hill. Jungfraujoch is also ideally situated as a starting-point for ski-ing tours.

The trains on the Jungfrau Railway run throughout the year, and during the winter season fares are reduced. In the winter months the service naturally is dependent upon the snow conditions. The snowfall at the altitude of the open section of the railway is very heavy, and the clearing of the line is the greatest task of those in charge of the railway.

In winter the Eiger Glacier Station is something like a self-contained colony. Stores and provisions of every kind are taken up to the station in the autumn, and in the depths of the season the snowfall is so heavy that the first floor of station and houses is entirely buried. Passages have to be cut through the snow before the occupants can go out of doors, and it is no mean task keeping those passages open.



A train on the Jungfrau Railway on its way to the Eiger Glacier, with the Jungfrau and Jungfraujoch in the background. Photograph by courtesy of W. Gabi, Wenjen.

Snow presents innumerable difficulties, but those at the Eiger Glacier Station prefer it to the treacherous "föhn," a warm wind from the south. At times this blows with such violence that it feels to the colonists as if the little station will be torn from its foundations.

Power for the railway is derived from the White and the Black Lütschine. When the railway was first opened the power station was at Lauterbrunnen, but this has been superseded by a larger station at Burglauenen, and the original station is now used as a reserve. The Lauterbrunnen power station is on the White Lütschine, and its output is 2,650 h.p. The modern Burglauenen station is on the Black Lütschine and generates 10,000 h.p. The power line to the Jungfrau Railway consists of a copper wire carried on pylons, and the 7,000 volts of the primary current is reduced to the trolley wire voltage of 650.

The locomotives of the Jungfrau railway were among the first electric locomotives in the world to be used on mountain railways. There are 11 in all, seven equipped for cog-wheel work only, and the other four for operation on both cog and adhesion sections of the track. Each is fitted with two 150 h.p. motors, and the current is collected from the overhead line by means of two contact bows. The rail current is collected by the undercarriage of the locomotive.

A train usually consists of an engine and three coaches, each with a seating capacity of 40. On an average a train weighs 30 tons. In addition to the locomotives, the rolling stock of the line includes coaches, goods wagons, a water tank and a snow plough.

Travel on the line is absolutely safe, for an automatic brake is applied as soon as a train exceeds the speed of 5.59 m.p.h. If an interruption in the electric current occurs, the locomotives can be driven downhill independently.



Clearing the Jungfrau Railway after a snowstorm. Photograph by courtesy of E. Heiniger, Zurich.



AIR NEWS

Empire Air Day

Special interest is attached to Empire Air Day this year, as 1939 marks the "coming of age" of the Royal Air Force, which came into being on 1st April 1918. The Air Ministry announce that Empire Air Day will be held on Saturday 20th May at 78 aerodromes, the largest number ever open to inspection by the public. Last year the total was 58. The aerodromes to be open this year will include 63 R.A.F. stations, 11 civil aerodromes where men are being trained for the Royal Air Force, Auxiliary Air Force, and R.A.F. Volunteer Reserve, and four purely civil aerodromes.

Empire Air Day is organised by the R.A.F. in conjunction with the Air League of the British Empire, and is the only occasion during the year on which the Air Force is at home to the public. It provides an opportunity for visitors to acquaint themselves with the various units of the Metropolitan Air Force, which is primarily concerned with the air defence of Great Britain, and with the activities of the Flying Training Schools.

The stations will normally be open from 2 p.m. until about 7 p.m. The programme at each will include flying displays provided by local units, supplemented in many cases by demonstrations of aircraft from other stations. The public will have the opportunity of seeing the performance of the latest types of monoplane fighter and bomber aircraft now in service. At most of the stations there will be several types of aircraft available for inspection by the public. Admission for adults will be 1/- and for children 3d.

New World Air Speed Record

A new world speed record for landplanes was set up recently by Flight Captain Dieterle, a German air pilot, when he covered a 3 km. course (1.86 miles) at the remarkable speed of 463.9 m.p.h. He flew a specially prepared Heinkel monoplane. The new record is 84 m.p.h. faster than the previous one, established on 11th November 1937 by Herman Wurster, at Augsburg, with a Messerschmitt Bf.113 monoplane. It is also higher than the record landplane speed of 394 m.p.h. over a course of 100 km. (62.14 miles), achieved on 5th June 1938 by General Major Udet in a Heinkel He 112U aeroplane. An interesting point is that each aircraft was fitted with a Daimler-Benz engine.



The Percival "Mew Gull" in which Mr. Alex. Henshaw flew to Capetown and back in the record time of 4 days 10½ hrs., in February this year. Photograph by courtesy of "Flight."

East Indian Government Buy Lockheed Fighters

The Colonial Government of the Netherlands East Indies have ordered 12 of the new Lockheed "212" general purpose military aircraft. This is the first order received for this recently-introduced machine. The "212" can be used as a bomber, fighter and troop carrier, and for blind-flying training. Those ordered for the East Indies will be equipped as military trainers.

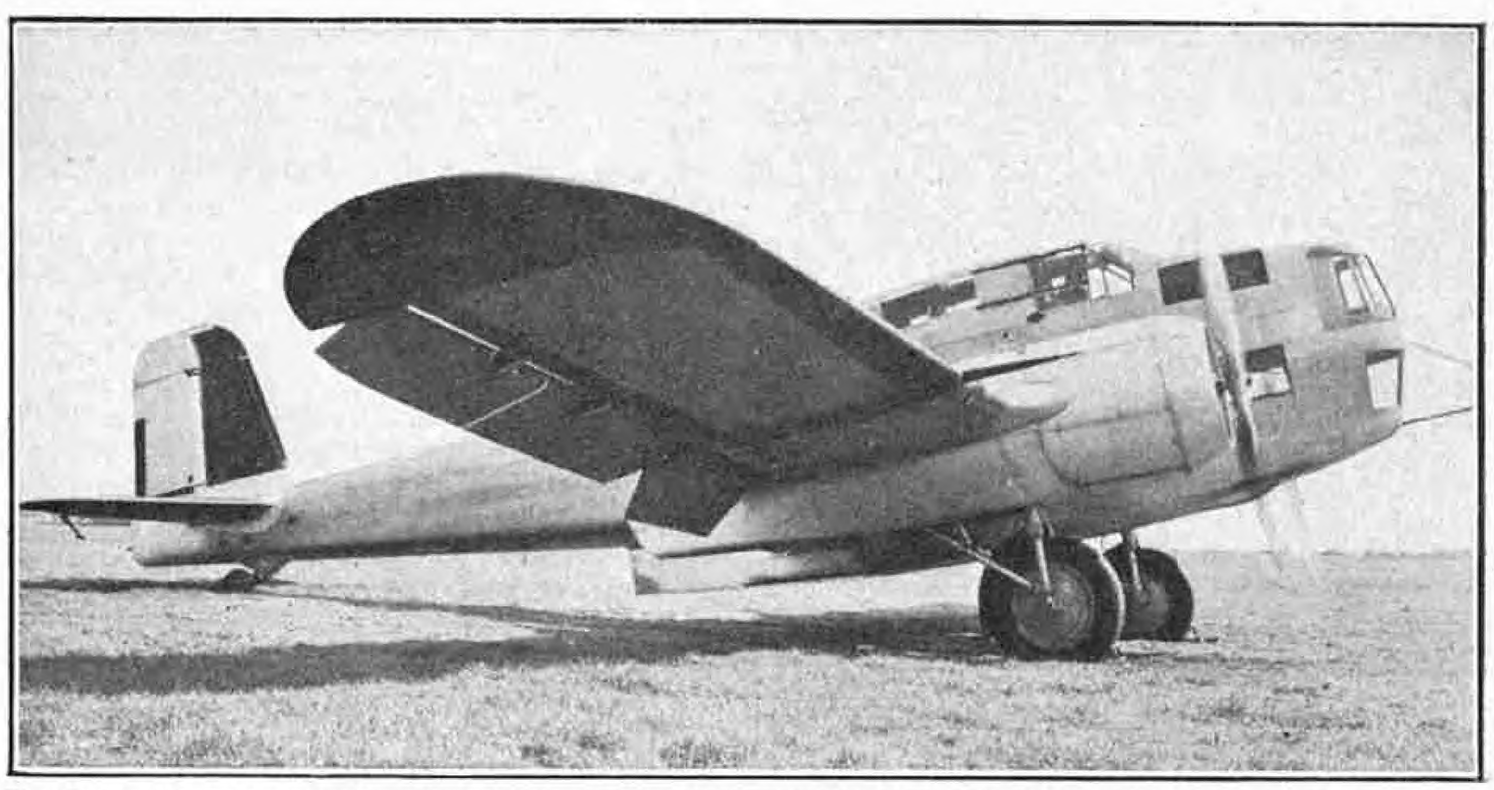
Each aeroplane will have a fixed machine gun in the nose of the fuselage and operated by the pilot, and a flexibly mounted gun in a rotating turret on top of the cabin. Bombing equipment will be carried on the underside of the wing, between the retractable landing wheels. The "212" is fitted with two Pratt and Whitney engines, and when loaded to a capacity of just over four tons it can climb to 10,000 ft. in 11 min., and can cruise non-stop for almost five hours.

Record Flight of "Blenheim" Bomber

On 14th March last the first Bristol "Blenheim" bomber to be delivered to South Africa flew from Capetown to Pretoria in 3 hrs. 22 min., a record for a flight between these two cities.

Bristol "Bulldog" Fighter for Science Museum

The Bristol Aeroplane Company have presented to the Science Museum, London, a Bristol "Bulldog" single-seater fighter partly stripped to show the all-metal internal structure. It has been placed alongside a 1916 Fokker fighter. The "Bulldog" is one of the most famous fighter aircraft ever produced in this country, and for many years it was the standard machine of its type in the R.A.F.



The Breguet 462B-4, a modern French twin-engined fighter and bomber. It is armed with three guns and carries a heavy load of bombs inside the fuselage.

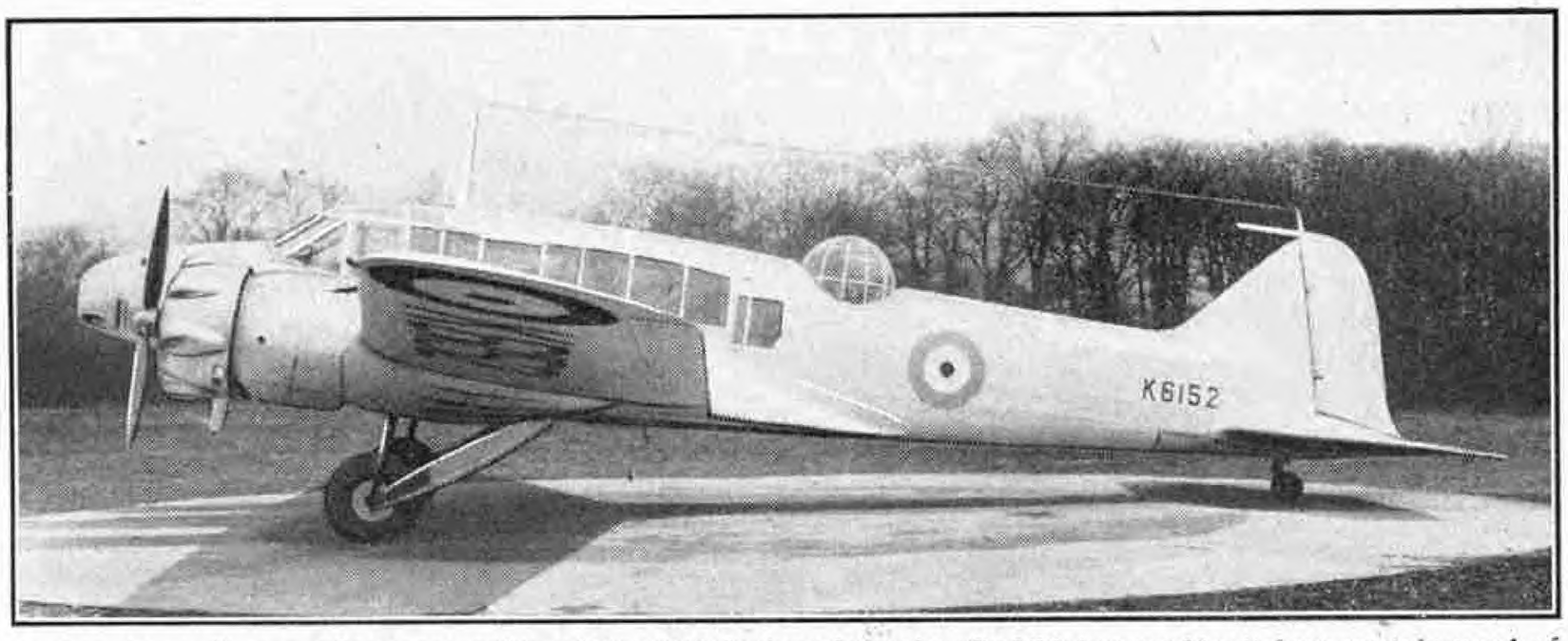
Transatlantic Survey Flight by the *"Yankee Clipper"*

Next month will be a notable one in civil aviation as it will bring with it the beginning of the first regular air mail and passenger service between this country, Eire, Canada, and the United States. The service will be operated jointly by Imperial Airways and Pan American Airways. The American company have also signed an agreement with Air France Transatlantique to operate a joint air mail service between France and New York by way of the Azores.

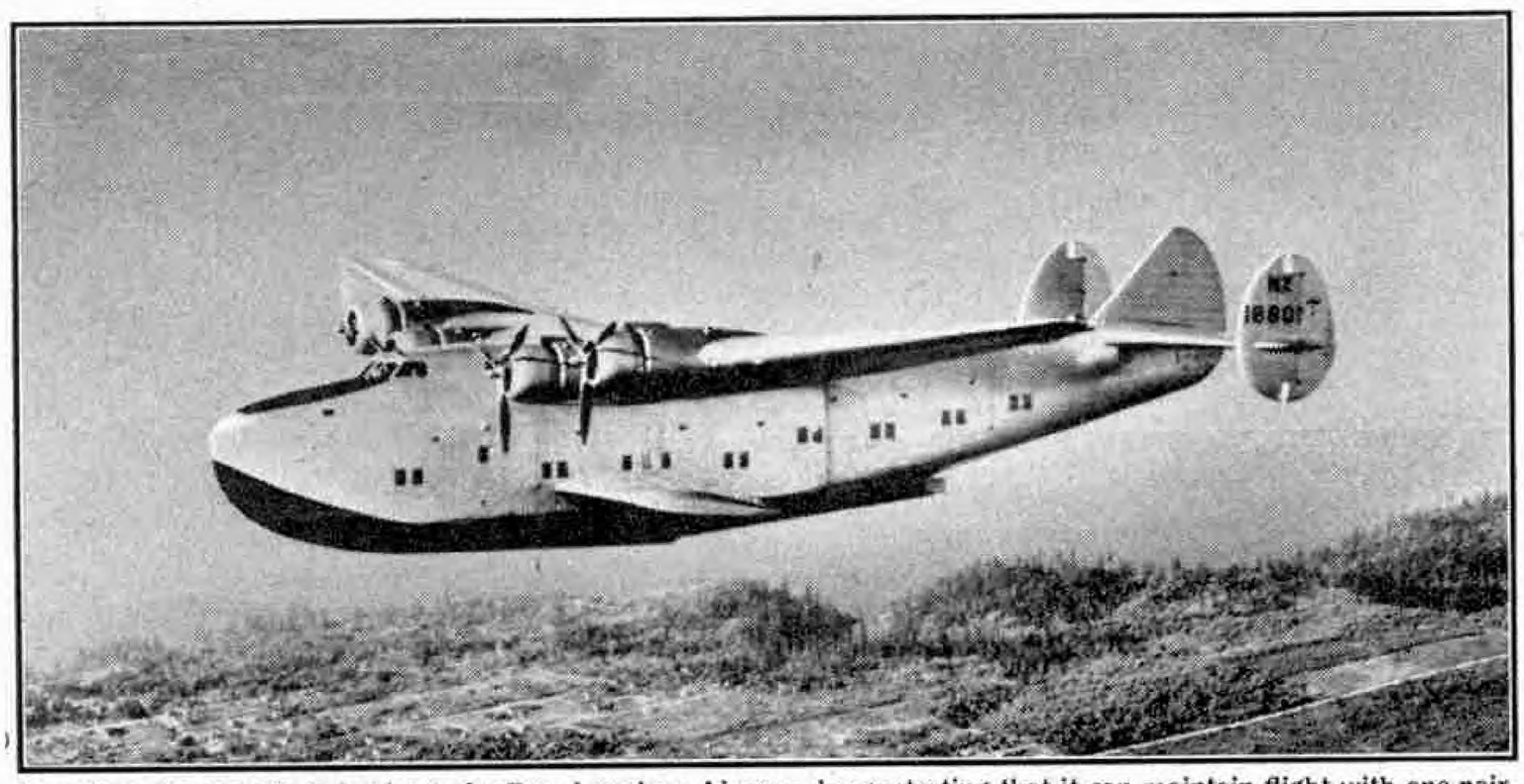
As a preliminary to these new services Pan American Airways recently carried out a transatlantic survey flight from Baltimore to Foynes by way of the Azores, Marseilles, and Southampton. The *"Yankee Clipper,"* one of the company's new Boeing 314 flying boats was used and took off from Baltimore on 26th March. The 21 people on board consisted of the crew and a party of technical experts among whom were representatives of the United States Civil Aeronautics Authority.

The first call was at Horta, in the Azores, reached after a 2,450 miles ocean flight accomplished in 17½ hrs. Three days later the flying boat flew on to Lisbon, covering the 1,100 miles in just over 7 hrs., and alighted on the estuary of the River Tagus. On 2nd April she took off from Lisbon for Marseilles, but owing to unfavourable weather conditions landed at Biscarosse, near Bordeaux, and flew on to Marseilles next day. From there the flying boat crossed to Southampton, accomplishing the 598 miles trip in just under 5 hrs. The Imperial Airways flying boat *"Connemara,"* one of the modified "C" class aircraft that will take part in the transatlantic service this summer, went out to meet the visitor and escorted her to Hythe. On 11th April the American flying boat went on to Foynes, Eire. On the return flight to Baltimore the stop at Marseilles was omitted.

The *"Yankee Clipper"* was piloted by Captain H. Gray, who piloted the Pan American Airways flying boat *"Clipper III"* in the 1937 transatlantic experimental flights. It carried 4,230 gall. of petrol, sufficient for a non-stop flight of 5,000 miles. The *"Yankee Clipper"* is one of a fleet of 42½-ton flying boats being produced for Pan American Airways by the Boeing Aircraft Company, of Seattle, U.S.A. Normally it can carry a crew of 12 and 72 passengers by day and 40 by night. It has two decks connected by a spiral staircase. The control room, mail and freight compartments, and crew's quarters, are on the upper deck and the passenger accommodation is on the lower one.



An Avro "Anson" reconnaissance monoplane of the R.A.F. In time of war aircraft of this type would patrol our coasts in search of hostile warships, and keep a lookout for enemy aircraft. Photograph by courtesy of A. V. Roe and Co. Ltd., Manchester.



One of the Boeing 314 flying boats for Pan American Airways demonstrating that it can maintain flight with one pair of engines stopped. A companion liner has been engaged on the transatlantic survey flight described on this page. Photograph by courtesy of the Boeing Aircraft Company, U.S.A.

"Weather Ships" for Transoceanic Airways

The extensive preparations now being made for operating airways across the oceans include the fitting-out of special meteorological ships, which will be anchored at suitable points on the routes. These ships will act as floating weather bureaux, and will distribute their news by radio to shore stations and to any ocean-flying aircraft that may be in the air.

One vessel of this type, the specially-equipped French steamer *"Carimare,"* sailed from Le Havre late in March to take up her position in the Atlantic, midway between New York and the Azores. Before her departure she was inspected by a party of British experts, including Air Ministry weather officials and Captains of Imperial Airways North Atlantic Division. One branch of the work of this "weather ship" will be sending up small pilotless balloons to which automatic radio transmitters will be attached. As each balloon ascends, its transmitter will send down to the ship signals concerning the barometric pressure and other conditions of the upper air.

Fast Flight by Air France Machine

The Air France company's Marcel Bloch 220 air liner that last year set up a commercial record of 53 min. for a flight from London to Paris has been in the news again. While operating recently on the Paris–Lyons–Marseilles service it accomplished one trip over this 400-miles air route in 2 hrs., including a 15-min. stop at Lyons, and the average speed for the full journey was 228 m.p.h. The machine had seven passengers on board. The Marcel Bloch 220 is a twin-engined 16-seater monoplane.

Eight British Air Services a Day to Paris

This summer will mark the completion of 20 years of flying on the London-Paris air route. This service began in 1919 with one flight daily between Hounslow and Le Bourget. This summer it will be operated jointly by Imperial Airways and British Airways, and there will be as many as eight flights daily in each direction, allowing a flight every two hours between 8 a.m., the time of the first, and 10 p.m., that of the last. "Frobisher" class air liners will be used.

This joint operation is only one feature of the recent re-arrangement of British air services to Europe, under which British Airways will considerably increase their commercial mileage. The company are planning to operate three new passenger, freight, and mail services from Heston airport to the Continent. One will be a weekday service to Brussels, which will be worked with the Lockheed "Electra" air liners withdrawn from the London–Paris service to make way for the "Frobisher" machines. A weekday service to Frankfurt and Budapest and a weekly service to Berlin and Warsaw will be operated with Lockheed 14s. The British Airways service from Heston to Hamburg, Copenhagen, and Stockholm is being flown each weekday.

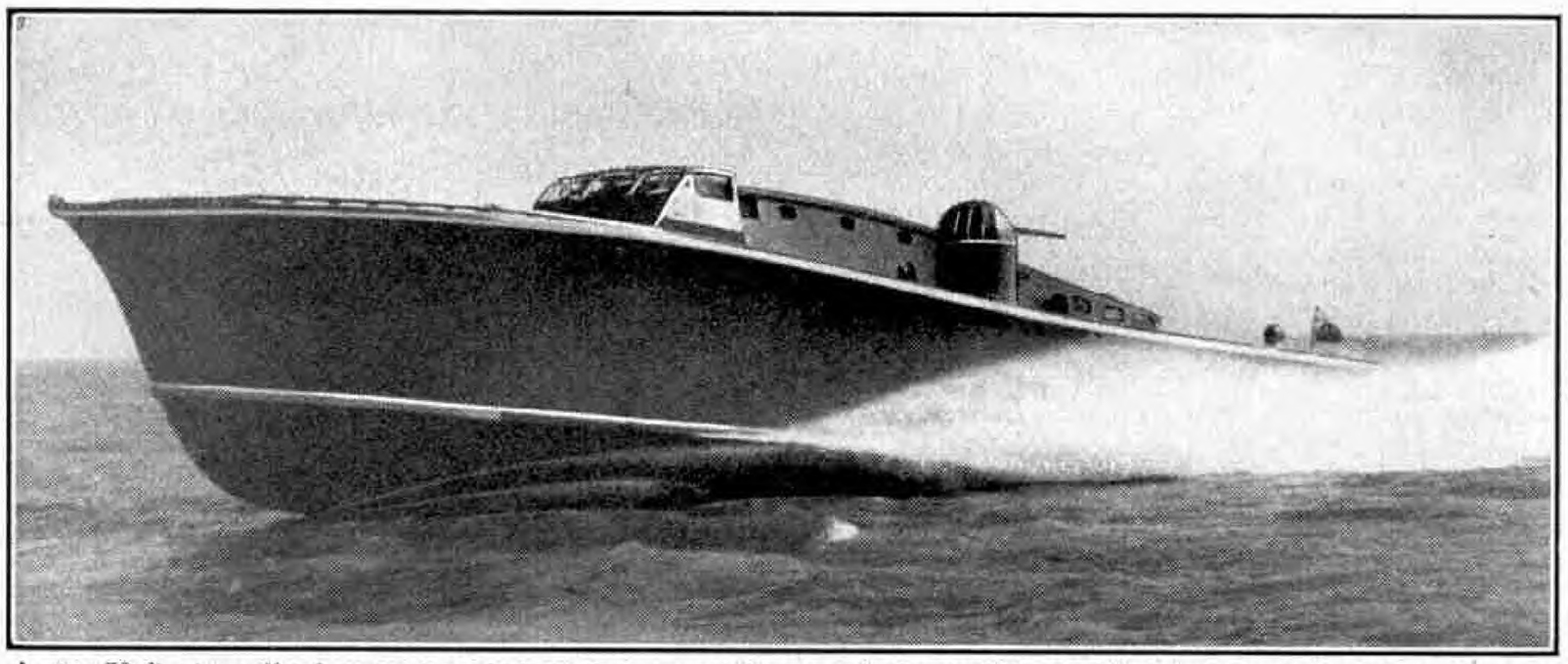
Flight Tests of New Alvis Engine

The new Alvis "Leonides" radial air-cooled engine recently passed the Air Ministry Civil Type tests. These tests have been followed by prolonged and successful flight trials, for which purpose the engine was fitted in a Bristol "Bulldog" biplane lent by the Air Ministry. During a flight from Portsmouth to Coventry, where Alvis engines are made, the "Bulldog" attained a top speed of 185 m.p.h. and cruised at 150 m.p.h. The climb during the first minute after take-off was about 1,500 ft. On arrival at Coventry the pilot gave a short demonstration over the Alvis factory, and later he reported that the engine had behaved very satisfactorily during the flight.

A New High-Speed Motor Torpedo Boat

Engines of more than 3,000 h.p.

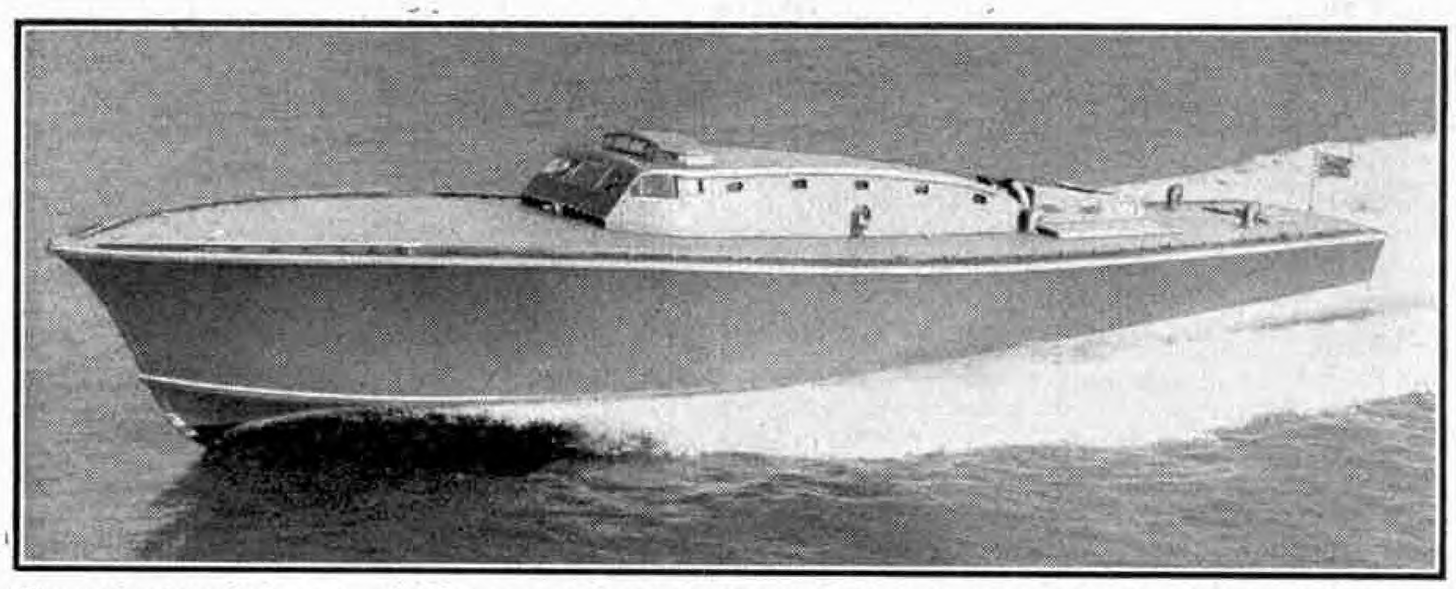
THE two illustrations on this page show the 70-ft. motor torpedo boat designed by Mr. Scott-Paine, and built by the British Power Boat Co. Ltd. at Hythe. This is the largest and fastest ever built in this country. She carries a heavier armament than any previous vessel of this kind, and in spite of her size presents a smaller target to the guns of a vessel attacking her. She is very difficult to detect from land, sea or air, for her wake is remarkably small at all speeds and one of her engines can be silenced to allow her to creep up unheard to her intended victim. During trials in the gales of November and December 1938 she proved to have remarkable sea-going qualities, and in demonstrations she approached other vessels near enough to fire her torpedoes at short range without being detected.



A new 70-ft. streamlined motor torpedo boat that can attain a speed of over 45 knots. The photographs on this page are reproduced by courtesy of The British Power Boat Co. Ltd., Hythe.

As the illustrations show, the new motor torpedo boat has the severely streamlined form of a racer, and when travelling at speed she literally skims over the water. The hull is of the hard chine type common to most of Mr. Scott-Paine's boats, and the bow projects well forward in a smooth curve from the stem. At first glance the vessel might be mistaken for a submarine, for her lines are as fine, and all superfluous deck equipment such as masts and aerials has been dispensed with. The only projections are the streamlined deckhouse, three gun turrets and two torpedo tubes. The lookout has an excellent all-round view of the horizon from an enclosed cockpit provided for him in the deckhouse just aft of the wheel position.

A door at the after end of the deckhouse gives access to the engine room, which can also be entered from the deck. There are the three 1,000 h.p. Rolls-Royce-Power-Merlin marine units that drive the boat, these being a marine version of the well-known aircraft type fitted in some of the fastest British military aeroplanes. The maximum output is about 1,100 h.p. at 3,000 r.p.m. Each engine has 12 cylinders arranged in "V" formation, in two banks of six, and their combined power gives the boat a maximum speed of over 45 knots, although the actual figure has not been disclosed. From a speed of 10 knots the boat can spurt to 40 knots in only 10 seconds, while slowing down again to 10 knots takes about 3 seconds.



The motor torpedo boat on trial last year, prior to the fitting of the armaments. The wheelhouse has since been rebuilt in one long sweep.

The exhausts from the three engines are carried away independently and there is a special silencer fitted to that from the centre engine, so that the boat moves practically without noise when the other engines are switched off. The wide range of speeds combined with other features make the new M.T.B. one of the most dangerous craft afloat, for using the centre engine with its silencer in operation, the boat can make a surprise attack on its objective under cover of darkness, unseen and unheard; the deadly torpedo launched, she can be out of range within a few seconds. Another feature of the new boat is her great range without refuelling, which is greater than that of any other similar craft. Seven tons of fuel can be carried, and with this she can cover 1,000 nautical miles at a cruising speed of 18 knots.

The main attack armament is of course the torpedo equipment, and there is a choice of two types. Four 18 in. tubes can be fitted, or two larger ones of 21 in. The guns also can be varied, but the boat will usually carry two 20 mm. anti-aircraft guns, and one 25 mm. weapon that is sufficiently powerful to sink destroyers, submarines, trawlers and similar vessels. The turrets in which the guns are fitted are revolved by power. The vessel also carries smoke apparatus and depth charges.

Mr. Scott-Paine, the designer of the new motor torpedo boat, has had life-long experience with ships, flying boats, marine engines and hydroplanes. He began to build motor craft in 1927 in a small yacht building yard on Southampton Water, near the village of Hythe. For some three years he built pleasure boats and a few for air liaison, ranging in length from 13 ft. to 35 ft. and with engines of 10 h.p. to 300 h.p. Then with a greatly improved yard, and a staff increased to 300, he turned his attention to the field provided by the Navy, Royal Air Force and the Army. After extensive and costly experiments a range of boats up to 47 ft. in length was planned, and a British engine was specially developed for use with them. It was then possible to produce the first of the new range. This was a 200 h.p. Aircraft Tender, and after severe tests the Air Ministry placed orders for the boats, and as pioneers they gave every satisfaction in operation.

To-day the company has a formidable list of standard craft, and its products are in regular use in many spheres of activity in the Navy, Royal Air Force and Army, and overseas.

Mr. Scott-Paine has also found time to build high-speed racing boats to compete for the world speed record and important international trophies. In 1929 he built *"Miss England I"* for Sir Henry Segrave, who with this boat created a world speed record at Miami, Florida, and also won the championships of Germany and Italy with a speed of 92.6 m.p.h. In 1930 Mr. Scott-Paine himself was very successful in American trophy races with a newer boat, *"Miss Britain I,"* which he designed, built and drove in many international events, finally winning the *"Detroit News"* International Trophy, and in the following year he retained this trophy. In 1933 he took a third boat, *"Miss Britain III,"* to America to challenge Mr. Gar Wood, the famous American speed boat pilot, and at Venice in 1934 he achieved a world sea-mile record of 110 m.p.h., which still stands.

World's Largest Man-Made Island

Marvels of the San Francisco Exhibition

By Harold J. Shepstone, F.R.G.S.

THE Golden Gate International Exposition, the great exhibition now open at San Francisco, is one of the most original and exciting ever organised. It cost over £12,000,000, and is unique in that it actually has been created on a man-made island of 400 acres in one of the most beautiful harbours in the world. This island lies between two of the greatest bridges ever built—the £20,000,000 San Francisco–Oakland Bay Bridge, longest and most costly erected anywhere, and the £9,000,000 Golden Gate Bridge, which has the longest single span ever created—and it has been aptly named Treasure Island.

The exhibition itself has been styled "*A Pageant of the Pacific.*" It was opened on 18th February and will close on 2nd December of this year, after which the island will be used as an airport. The three principal buildings of the exhibition indeed are permanent structures, one being the future Air Terminal Building, and the other two gigantic hangar buildings designed to accommodate aircraft greater than any now known. The latter two are known as the Palace of Fine and Liberal Arts and the Hall of Air Transportation.



The unique island on which the San Francisco International Exposition is being held. It was built up by pumping black sand from San Francisco Bay into a space enclosed by a sea wall three miles long. The Tower of the Sun in the centre of the exhibition is 400 ft. high and a carillon with 44 bells is mounted on it.

Treasure Island has been built on what were known as the Yerba Buena Shoals, which lay just north of Yerba Buena Island, halfway across the San Francisco–Oakland Bay Bridge. The initial work was undertaken by the American Army Engineers, whose first task was to assemble their dredges, a fleet of nine at one time, and to pump black sand from the floor of the Bay and sluice it through pipelines over Yerba Buena Shoals. From a natural depth varying from 2 ft. to 26 ft. below the surface of the water, a 400-acre rectangle mounted up to its present elevation of 13 ft. above the tides, and stands now as the largest island ever built by man, containing 20 million cubic yards of sand compacted within a sea wall 17,000 ft. long, containing 287,000 tons of quarried rock.

The island is 5,520 ft. in length and 3,400 ft. wide, and is connected to the rocky shore of Yerba Buena Island by a great causeway on which are six lanes of highways to link the exhibition with the traffic streams of the Bay Bridge. Five ferry slips supplement these highways in transporting visitors to and from Treasure Island at the peak rate of 53,000 hourly. Three of these are on the San Francisco side, and the other two, on the east side of the island, provide service for visitors from the Oakland shore.

On Treasure Island there are many unique features unprecedented in the world of exhibitions, but air-minded visitors are mostly interested in and thrilled by the immense Hall of Air Transportation. Here thousands of visitors watch daily, through plate glass partitions, every step in the routine servicing of giant planes, for Pan American Airways established their trans-Pacific base on Treasure Island even before the exhibition opened. Then, from the near-by loading and unloading dock in the Port of the Trade Winds, passengers depart and arrive to and from the ports of the far Pacific, big 74-passenger China Clippers swooping in and out on scheduled flights, all in plain view.

All the buildings on Treasure Island save the three already mentioned are of temporary construction, for removal after the exhibition is over to provide aeroplane runways. The main group comprises six great blocks of exhibit halls radiating from a central Court of Honour and spaced by broad courts. These stately palaces provide combined display space approaching 1,000,000 sq. ft. and cost some £1,700,000. A conspicuous feature of the skyline is the slender 400-ft. Tower of the Sun, only 57 ft. in diameter at its base, in the Court of Honour. This alone cost £82,000. It competes in height with the lofty towers of the Bay Bridge near at hand, and is 72 ft. taller than the wooded crest of Yerba Buena Island. On it is mounted a 44-bell carillon, which floods the Exhibition with its music.

More than 10,000 timber piles support the buildings, both temporary and permanent, on Treasure Island. The pageant of constructional materials used alone would be imposing, calling for a goods train of 20,000 wagons, with a total length of more than 200 miles, to move the staggering load, which would include 30,000,000 board feet of lumber, 5,000 tons of steel, 30,000 yards of concrete aggregate, and 100,000 yards of top loam for landscaping.

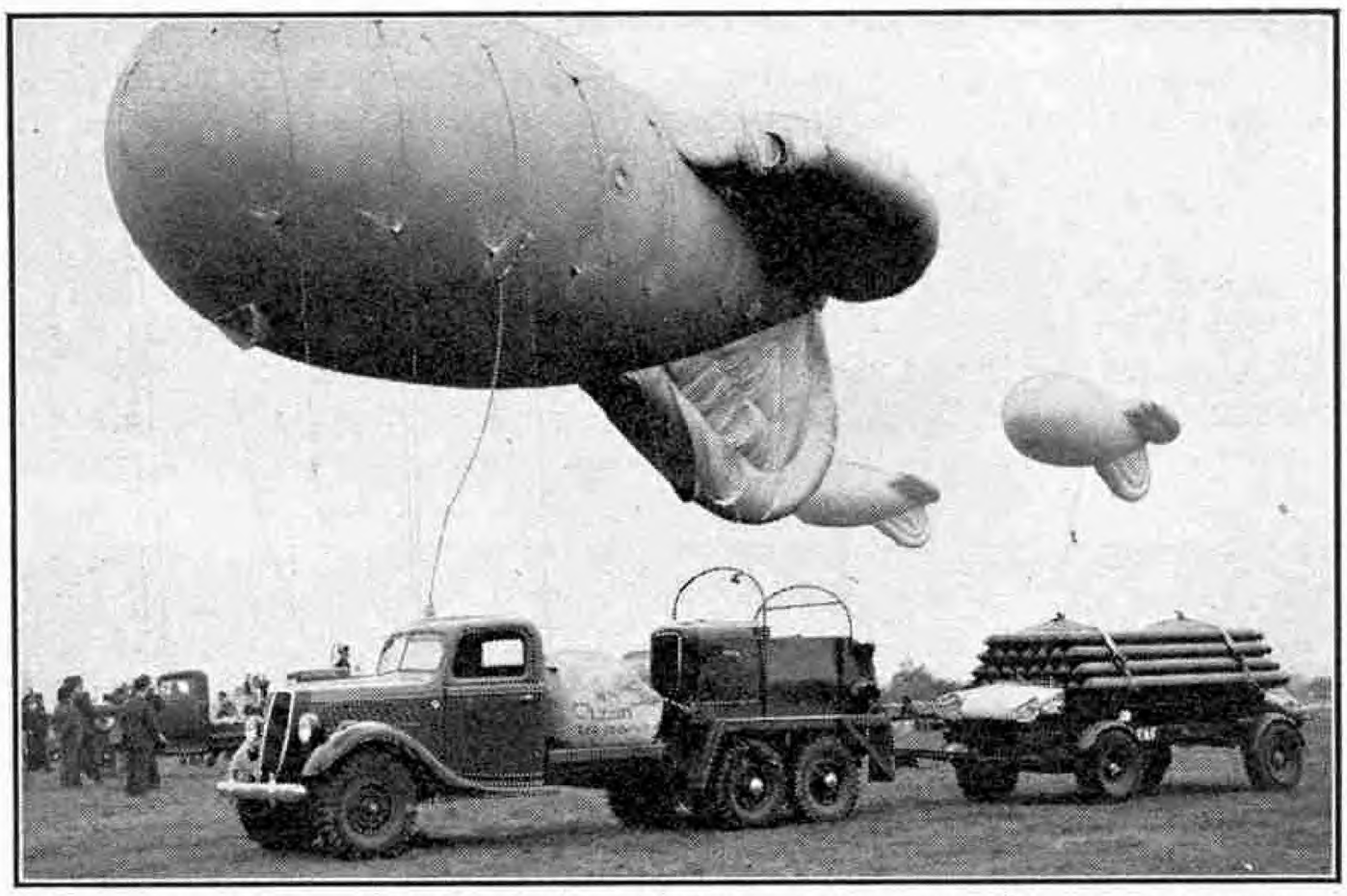
A pipeline across the Bay Bridge, designed with rotating and sliding joints to conform to bridge flexing, carries San Francisco water to a 3,000,000-gallon reservoir on the Yerba Buena skyline. Thence it flows by gravity through more than 16 miles of pipes to every corner of Treasure Island, supplying nearly two million gallons dail y.

Balloon Barrages for Air Defence

How They Will Ward Off Raiding Bombers

THE measures adopted to defend this country from attack by air have long included the provision of powerful searchlights, anti-aircraft guns and high-speed fighter aircraft. A further strengthening of the nation's defence is now being carried out by the formation of Balloon Barrage squadrons, as a branch of the Auxiliary Air Force.

Balloons were used as military observation posts in the Boer War and during the Great War, but they were not utilised as a means of defence until towards the end of the latter, when balloon "aprons" were introduced to assist in protecting London from attack by air. Each apron was supported by five kite balloons spaced about 500 yds. apart in a line at a height of between 7,000 ft. and 10,000 ft. The balloons were linked together by a wire from which hung a series of light steel cables, about 25 yds. apart, forming the "apron," or barrage, 1,000 ft. deep.



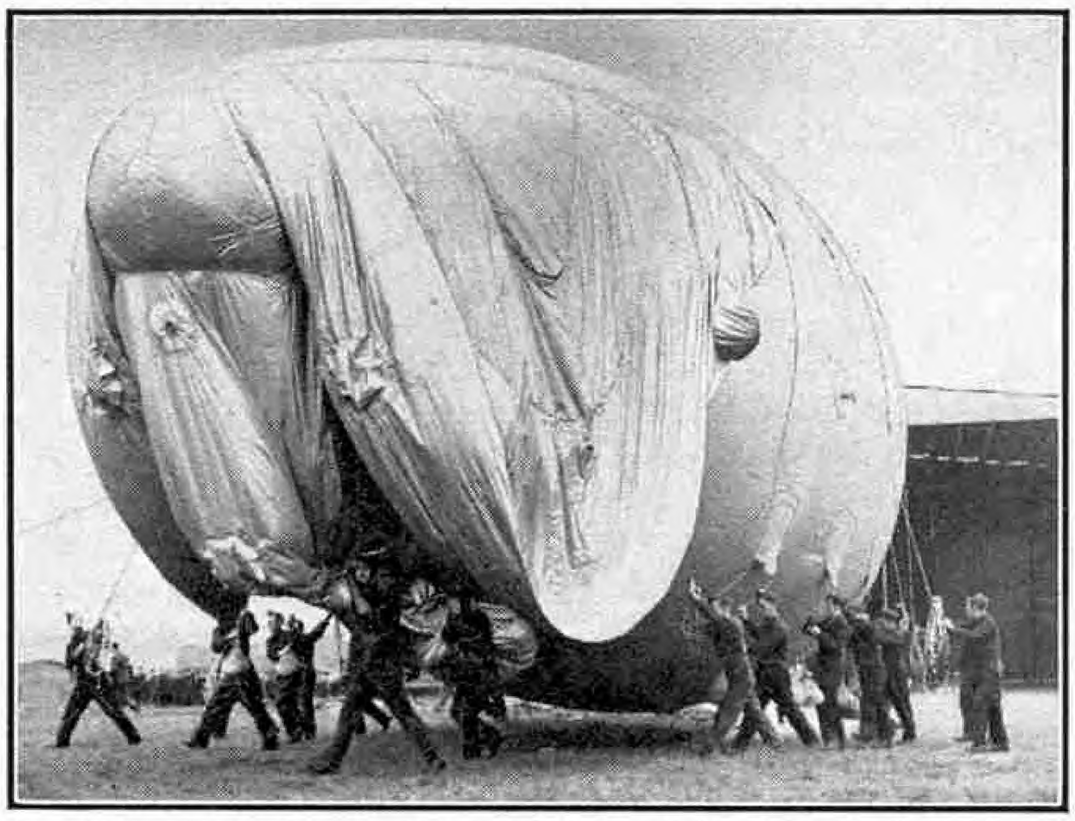
Balloon Barrage units in action during a demonstration at No. 1 Balloon Centre, Kidbrooke. In the foreground are the winch lorry and the trailer-load of gas cylinders of one of the units. Photograph by courtesy of "Flight."

A kite balloon differs from the familiar spherical balloon in being almost sausage-shaped and tapering toward the stern, where there are three large fins. It is in fact more an airship than a balloon in shape. Two of the fins are horizontal, one at each side, and act as stabilisers. The third is a vertical one on the underside of the envelope, and serves as a rudder. All three help to steady the balloon in the air and keep it head on to the wind.

By the close of the War 10 of these aprons were in service around London. The idea was good, but the method employed had several disadvantages. The weight of the apron caused it to sag, and this in turn pulled, or "bunched," the balloons together, thus shortening the distance over which the apron operated. The weight of the cables also made it necessary to employ very large and unwieldy balloons to obtain the "lift" required to hoist the network to a practicable height.

In the modern balloon barrage there is no heavy network of cables. Each balloon is tethered to earth by a long wire cable, and it is these cables that present the obstacle to attacking aeroplanes. It might be thought that single cables are less likely to deter enemy aircraft than the extensive aprons previously used. The balloons of a barrage would be close to each other, however, and it would be difficult for a long-range bomber, with its considerable wing span, to thread its way safely through the forest of cables when flying at high speed.

To add to the difficulties of raiders, the cables would be almost invisible at night, and in time of war they would be made lethal by a secret process, to ensure the complete destruction of bombers that came into contact with them. The only resource of enemy pilots would be to fly above the barrage, which would rise to a height of more than 19,000 ft., and there they would not only have less chance of bombing their objectives with success, but also would become excellent targets for the defenders. The main purpose of a balloon barrage indeed is to force air raiders up to a height at which anti-aircraft batteries can deal with them quickly and effectively, and at the same time to reduce the air space in which defending fighter aircraft would have to search for their foe.

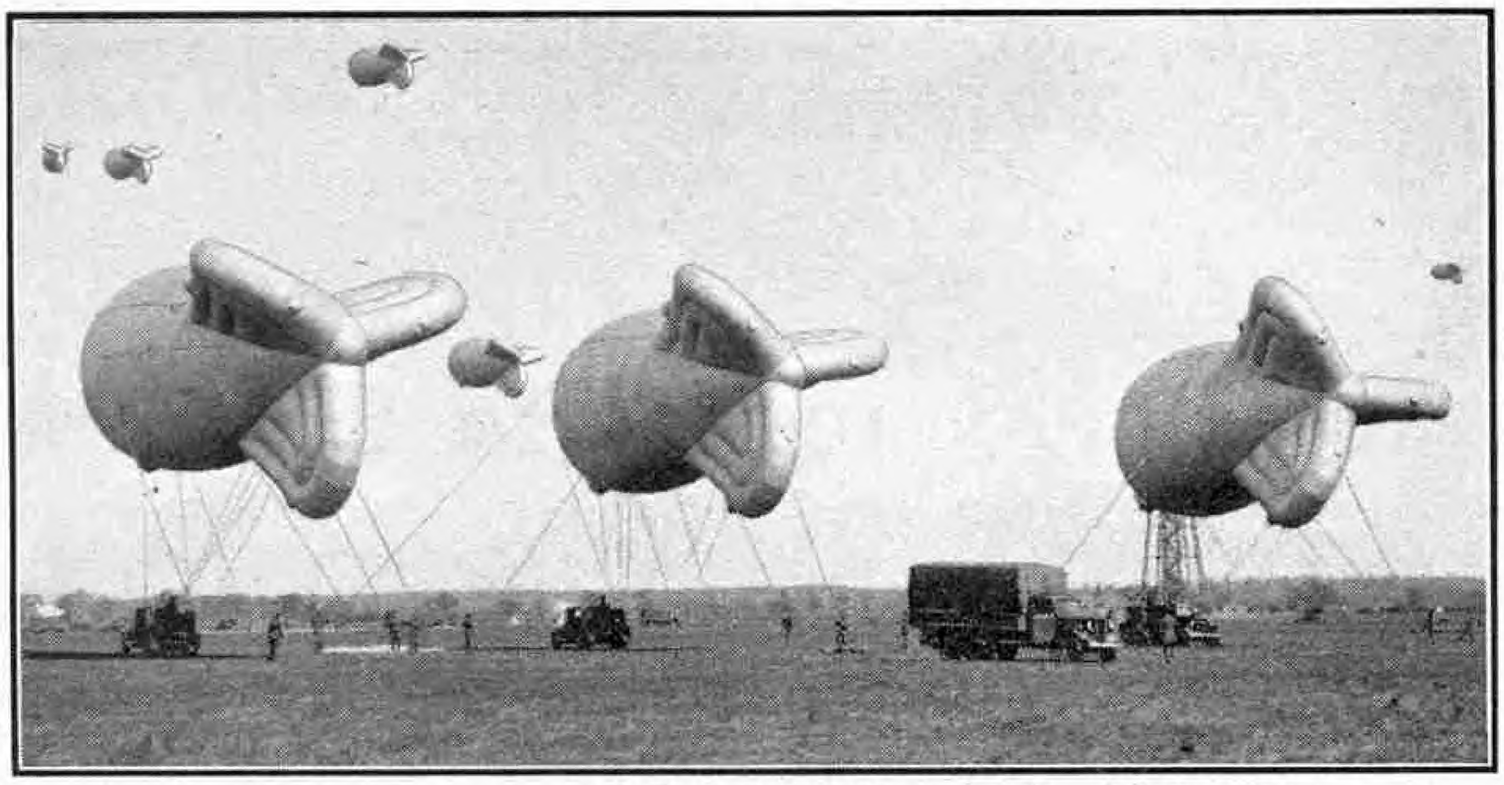


One of the balloons at Kidbrooke being hauled on to the demonstration field after being inflated in the shed on the right.

A Balloon Barrage squadron consists of 45 units, with a total of 60 regulars as instructors and about 450 volunteers of the Auxiliary Air Force, giving a crew of 10 men to each balloon. The upper illustration on this page shows the equipment of one of these units. A specially designed six-wheeled lorry carries the balloon, which is deflated and carefully packed, together with the winch,

mooring cable, and other necessary tackle. The hydrogen for inflating the balloon is stored under high pressure in cylinders, 36 of which are piled on a special trailer.

At the scene of the intended barrage a ground sheet is laid down for each balloon, with small sandbags grouped at intervals round its edge. The balloon is then laid flat on the sheet, and its mooring ropes are fastened to the sandbags, which anchor it to earth while it is being inflated. The gas is fed from the cylinders to the balloon through flexible pipes enclosed in a long canvas tube sometimes called the "filling sleeve," and the supply is taken from several cylinders at the same time to speed up the job. The barrage balloons at present in use each have a capacity of about 20,000 cu. ft. of gas.

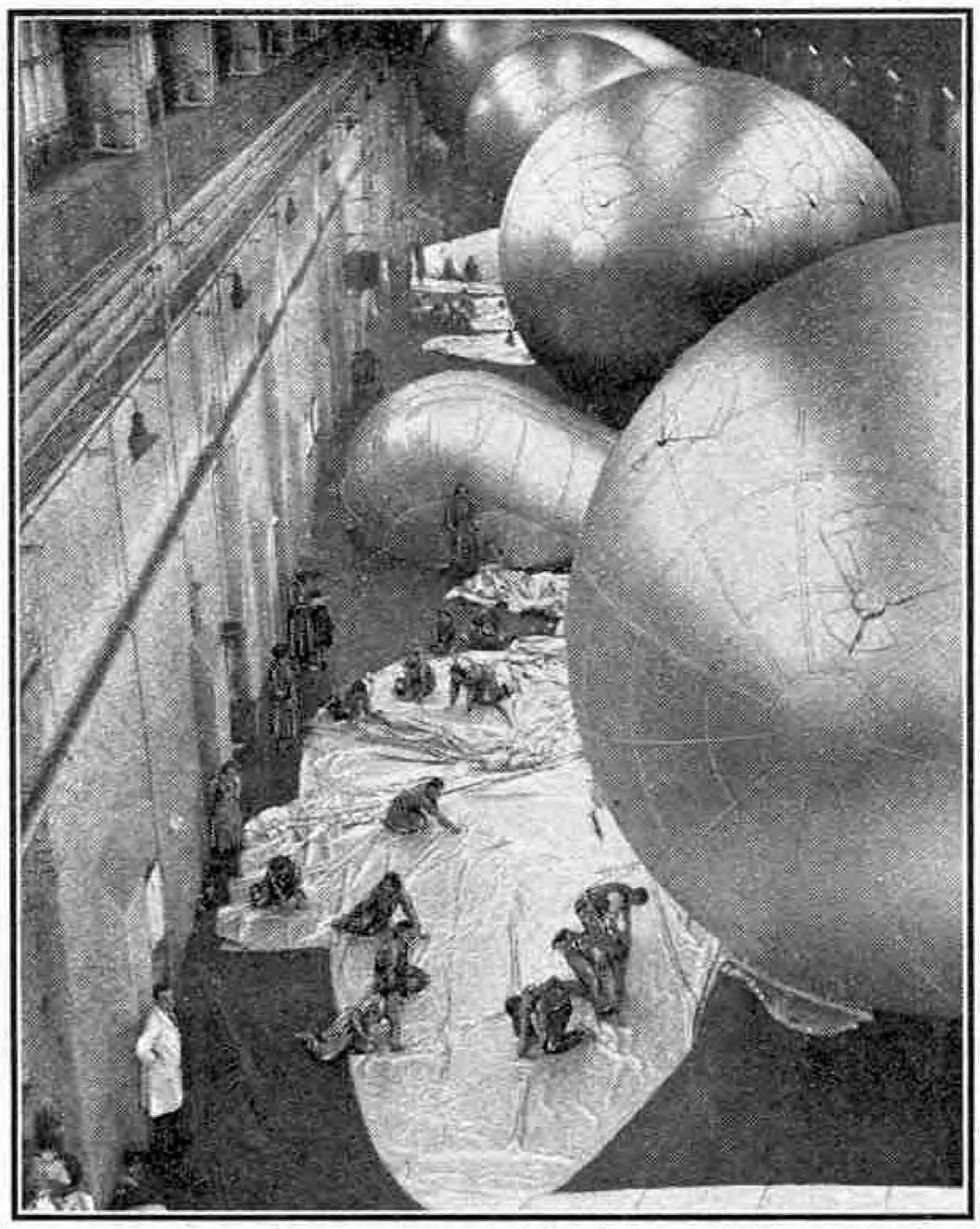


Barrage balloons being sent up. In this rear view they look rather like a battalion of rams.

When the balloon has been inflated it is transferred to the winch that will be its anchorage while it is in the air. The free end of the mooring cable, which is wound round the drum of the winch, is secured to a special fitting attached to the underside of the balloon. The mooring ropes are cast off, and the cable is paid out until the balloon has reached the height required. As the balloon rises the two stabilising fins and the rudder fill with air, which enters then through a short scoop in the nose.

A balloon keeps its shape by being blown up tight like a football, but the hydrogen does not fill the envelope at the beginning of an ascent. The gas expands as the balloon rises to a height of many thousands of feet, and the atmospheric pressure upon it gradually decreases, and obtains the extra room it needs by pressing down upon an air chamber, or "ballonet," within the envelope, and expelling some of the air from it. When the balloon descends the reverse takes place, the hydrogen contracting and the ballonet expanding as it becomes filled with air.

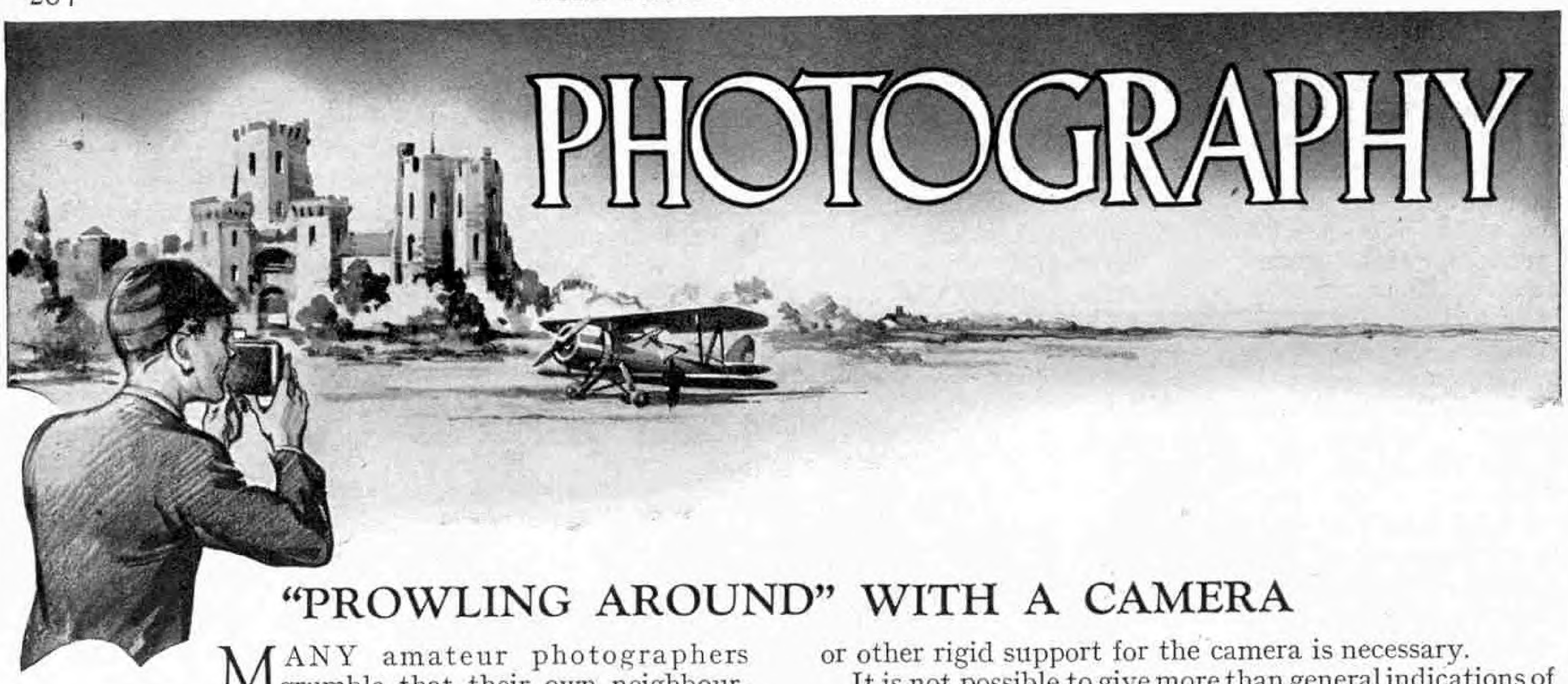
The envelope of the balloon is not absolutely gas and air tight. Hydrogen slowly leaks out, and air filters in, with the result that "lift" is lost. The balloons of a barrage therefore would be hauled down periodically and additional hydrogen fed into them to make good the deficiency, and also to prevent an explosive mixture of hydrogen and air from being formed. When no longer required a balloon is hauled down to within reach of the handling crew, and the valves are opened so that the hydrogen can escape. The mooring ropes dangling from the sides of the balloon are again attached to the sandbags, and with the balloon back on the ground the crew, wearing special shoes that will not damage the fabric, stamp any lingering gas out of it before re-packing it.



The Dunlop factory at Manchester, showing balloons under construction.

There are 10 Balloon Barrage squadrons in the London area alone, and it will be seen that an immense number of balloons would be required to defend the whole country in this way from attack by air. Special equipment has been developed at the Dunlop balloon factory in Manchester for making this vast quantity by mass production methods in time of national emergency. The fabric from which the balloons are made in this modern factory is a new one, lighter, and with better gas-holding properties than any hitherto used for aeronautical work. The presence of grit would be fatal to it, and everything possible therefore is done to ensure cleanliness during the making of the balloons. The rooms in which the work is done are suggestive of hospital wards, as the walls are cream-coloured, the air is conditioned, and the lighting is arranged to throw only the minimum of shadows.

The Balloon Command of the Auxiliary Air Force includes Balloon Barrage squadrons to protect London, Birmingham, Manchester, Glasgow and other important centres. Each squadron is recruited and administered by the Territorial Army and Air Force Association responsible for the county or area in which the squadron is located. Under the present scheme nearly 50 such squadrons are being formed in this country, for which more than 2,000 balloons are required. How to join and details of the age limits and periods of engagement were given in the *"Air News"* pages of last month's *"M.M."* The progressive training involves regular attendance throughout the year for 2 hrs. on one evening a week and for one week-end in three. In addition both officers and men are required to carry out training for 30 hrs. every year and to attend at annual camp for 15 days, to keep them up to date and in practice.

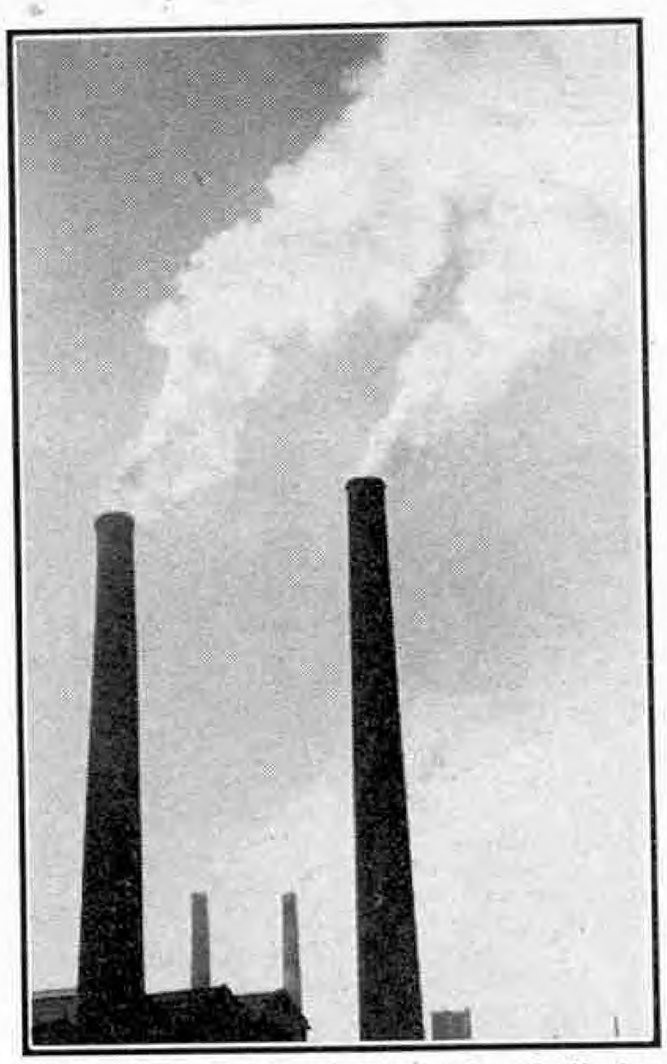


"PROWLING AROUND" WITH A CAMERA

MANY amateur photographers grumble that their own neighbourhood does not contain anything that it is worth while to photograph. A few days ago I was invited to inspect a collection of "snaps" taken by one of my young friends living in a small industrial town in the north. Knowing that he possessed only a cheap box camera, and that apart from his summer holiday he had few opportunities for getting far from home, I fully expected to see the usual stereotyped prints of relatives and friends photographed in the garden, portraits of the dog, etc. Some prints of this kind certainly were included, but I was surprised to find that the great majority were quite out of the ordinary, and included several that were of real competition standard. I learned later that practically all of his pictures had been taken within a few miles of his home, during strolls through the town and surrounding countryside! "Prowling around with the camera" he called it, and he assured me that he obtained a great deal of pleasure from every excursion and rarely returned without at least one or two good "snaps."

It occurs to me, therefore, that photographers who complain of the lack of subjects near at hand will be well advised to adopt my young friend's system and indulge occasionally in a "prowl around." The main essentials, if such excursions are to be successful in producing a crop of "snaps" of the right kind, are to keep one's eyes open and to be prepared for every chance that comes along. Some of the finest photographs that have ever been taken were the result of making the most of an unexpected opportunity. Almost any type of small camera is suitable for use on these expeditions, and providing rapid panchromatic films are used it is seldom that a long exposure necessitating the use of a tripod or other rigid support for the camera is necessary.

It is not possible to give more than general indications of the kind of subjects to look for, as so much depends on the character of the neighbourhood in which the photographer lives. I have included on this and the opposite page a few illustrations showing the kind of subject that may "happen along" at any time, and which if once missed, often can never be photographed again. A particularly good example of this is the "*Two Faced Clock,*" which was photographed during a stroll near the Pier Head, Liverpool. Such a subject would not be very exciting in the usual way, but it is so seldom that the famous Liver Clock is caught "napping" that the occasion of its lapse was a chance too good to be missed!



"The white smoke of the brickworks." An attractive "prowling around" photograph by F. Schorrewegen, Lierre, Belgium.

Another good example of the way in which striking and often beautiful subjects sometimes crop up in the most ordinary surroundings is the fine picture of an industrial scene on this page. Only the sharp-eyed prowler constantly on the alert would obtain such a picture as this, for normally the beautiful formation of white smoke issuing from the chimneys is replaced by less pleasing masses of sooty blackness.

Opportunities for out of the ordinary snaps occur in the most unlikely places and often in quite unexpected fashion. The "*Family Outing*" picture shown on this page is a good example of this. A swan and her young family waddling unconcernedly about a public square is not a subject one can arrange to order, and it is only the wise photographer who makes a point of always having his camera "at the ready" who is likely to obtain shots of this kind.

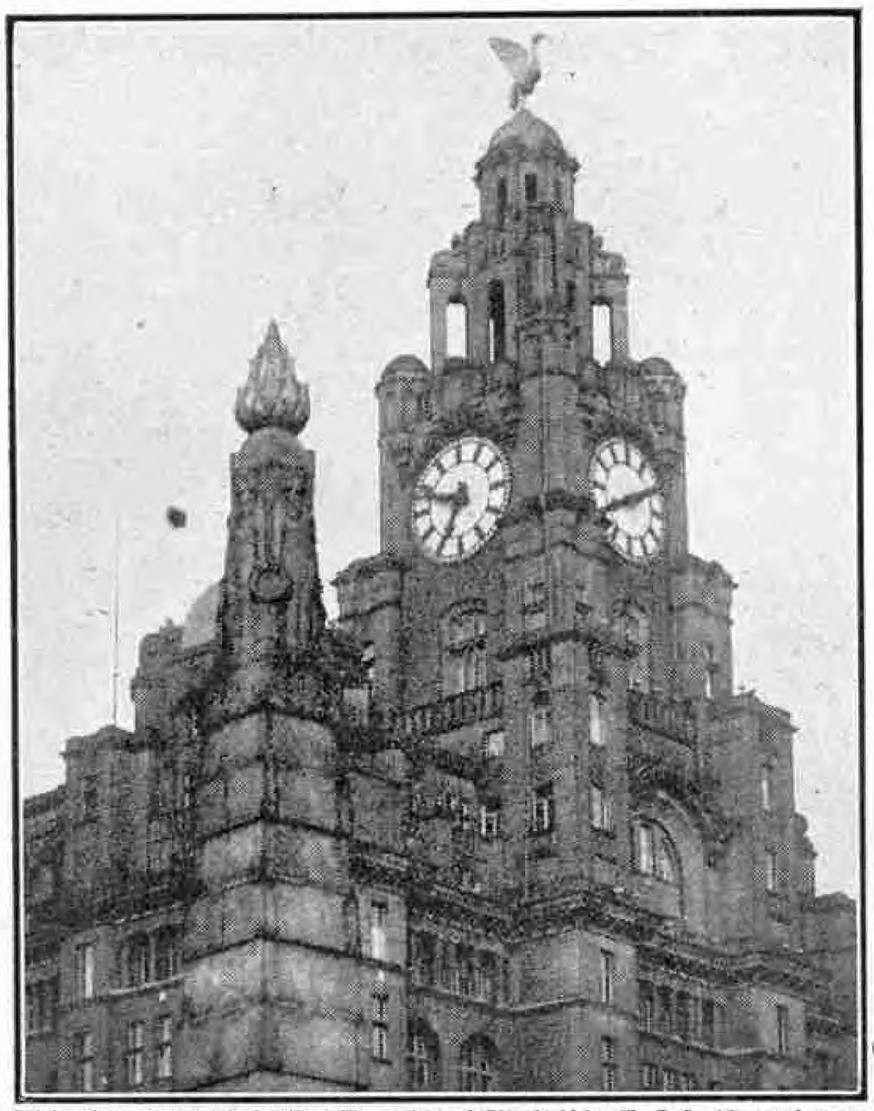


"The Family Outing." An interesting and unusual "snap" by G. McTaggart.

In a large town there are splendid opportunities for "prowling around" photographs in the demolition and re-building operations that are

constantly in progress. Large old buildings that have outlived their day are demolished to make room for more modern structures, sometimes of a quite different kind. Often the demolition work reveals an unexpected and interesting view that will disappear again when the new structure rises in its place. Here then, is an opportunity for the keen photographer! A view of the old building during demolition should be taken, and then the scene revealed by the uncovered site. Finally a picture of the new building when erected will complete a most effective series, which will gain in interest as the years pass by.

Another good spot to visit during "prowls" is the local park. There all sorts of interesting subjects will be found, including children, animals, birds, flowers, landscapes and games, and it will have been a very poor day indeed when the camera owner has to return home without having found anything worth photographing! For example, a group of children could be photographed, and if a dog is included so much the better. Those who are shy of using a camera in public will generally be able to find a "hide-out" such as a tree trunk sufficiently close to the subject to enable a good sized image to be obtained. The great thing to be remembered always in this kind of work is to obtain the picture unknown to the subject, so as to avoid the unnatural attitudes that people invariably adopt when they know they are being photographed.



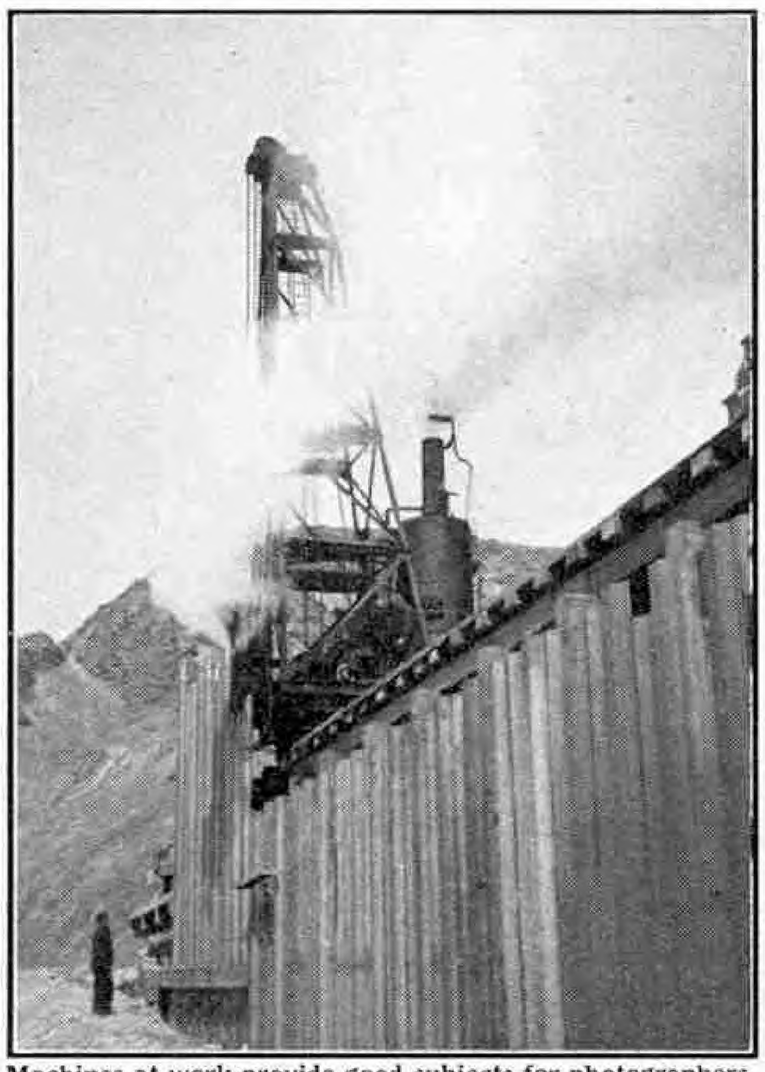
This picture entitled "The Two Faced Clock," by T. C. L. Hutcninson, Liverpool, is a good example of the kind of picture that rewards the photographer who keeps his eyes open!

Here I think it advisable to give a word of warning. Exposures under trees are very tricky and there are lots of trees in the parks. Even on the brightest day an undertrees group will need a 1/20th or 1/10th sec. exposure with quite a large aperture. With a camera that has only a simple lens working at a small aperture it is best not to attempt photography under trees, but to wait until a suitable subject is found out in the open.

It should be borne in mind also that box-type and other simple cameras are not suitable for photographing children or animals running about, even when out in the open. Generally the fastest shutter speed on such cameras is about 1/50th sec., and this is far too slow to arrest the movement of rapidly moving limbs! There are plenty of park subjects however that can be tackled successfully with a simple camera. Sunshine through the trees, shady glades, the lake, etc., are all suitable pictures that can be taken in the most leisurely manner, and the necessary exposure can be given without risk of blurring.

There are many subjects that do not show to the best advantage if photographed from the viewpoint from which they are first seen, even when this is a striking one. Much better grouping and lighting of the chief features of the scene can perhaps be obtained by taking up a position a few yards away, and it is always advisable therefore before releasing the shutter to view every scene from as many points as possible. A picture carefully sought for and composed in this way will give far more satisfaction than a mere "snapshot" in the making of which no discrimination of viewpoint was exercised.

Pictures that are "different" can be taken from a low view-point. "Snaps" of this kind are seldom seen, and although many subjects are not suitable for treatment in this manner, others are much more effective than if they were photographed from eye-level. Tall trees or monuments, and there are usually one or two specimens of the latter in almost every park, are particularly attractive when photographed in this way, especially if they are silhouetted against a background of fine clouds. White clouds on a blue sky are usually the most effective, but a yellow filter used in conjunction with a panchromatic film will be required to reproduce them in their full glory. The early summer sky is so bright however that even with a filter over the lens the exposure required is sufficiently short to allow the camera to be held in the hands. Every photographer should make a point of making a few prints in this way, but the subjects must be chosen carefully if the best results are to be obtained.



Machines at work provide good subjects for photographers. This example, showing a pile driver in action, is by J. E. Martin, Fishguard.

The time is now approaching when pageants and carnivals will be held in many towns and villages throughout the country. Many of these events are based on ancient customs, and are of particular interest to the photographer who wishes to obtain permanent records that will be of interest in years to come. Any ordinary type of hand camera may be used for the photography of street processions, but those fitted with a wire direct-vision finder are the best as they enable the camera to be held at eye level, a considerable advantage when "snapping" in a crowded street.

If only a simple camera is available no attempt should be made to photograph the procession when passing at right angles to the lens. A high speed shutter and a large aperture lens are necessary to obtain good results from such a position. The best plan for the owner of a simple camera is to select a place near a street corner and "snap" the figures from a nearly head-on view point. If this is done an exposure of 1/25th second at F/8 will be suitable. It is advisable to take two "snaps" of each picture. If this is done the chance of obtaining one good negative will be greatly increased.

The Romance of Scrap Iron and Steel

Large Scale Demolition Work

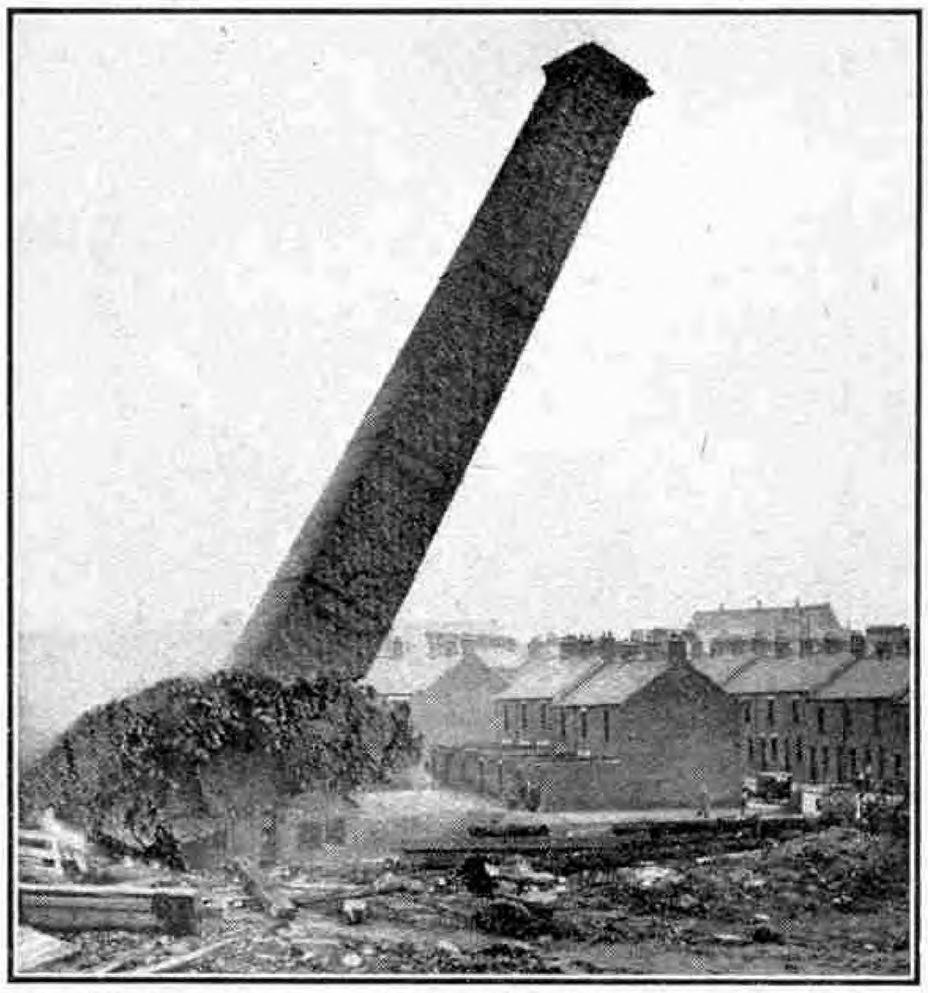
THERE are few things more thrilling than to watch a gigantic chimney stack toppling over at the bidding of the steeplejack, falling exactly in the place intended. It is equally interesting to see other less spectacular forms of demolition, such as the breaking up of an old tramcar, or the dismantling of a huge building, a bridge, or some steel erection such as an outworn gas holder, or a blast furnace that has outlived its usefulness.

Very few people realise how much is involved in work of this kind. It is usually thought of as mere destruction, carried out by workmen who ply pick-axe and hammer without much discretion, and finally cart away the heaps of rubbish they create. Demolition work in fact has provided many good jokes based on this mistaken notion. Actually it is seldom spectacular and scarcely ever funny, while in many cases it may become dangerous. It is work for experts possessing a sound knowledge of engineering and of building methods and materials. Even that is not always sufficient, and there have been instances in which knowledge of such matters as the geology of the neighbourhood in which the work is carried on has had to be taken into consideration in deciding exactly how to proceed.



Breaking up old tramcars. After pulling the bodies over on their sides they were set alight to burn out unwanted woodwork. The illustrations to this article are reproduced by courtesy of George Cohen, Sons and Co. Ltd., London.

The felling of a chimney stack, perhaps the most exciting form of demolition, is as much a triumph for those concerned as its erection was for its builders, for the falling mass has to be very carefully handled in order to prevent it from getting out of hand and causing vast damage. This of course is particularly important when there are buildings or roads near the stack, for if the latter falls only a few degrees away from its intended line the results may be disastrous.



Felling a giant chimney at Belfast. The stack fell exactly along the line prepared for it. Photograph by courtesy of the "Belfast Telegraph."

When one of these giants has to be brought down, the line along which it is to fall is first settled, and this is indicated on the stack by a vertical mark facing the direction in which this is to go. The brickwork that has to be removed at the bottom of the stack in order to rob it of support, and so to bring it down, also is carefully marked, and a hole from 6 ft. to 8 ft. wide is then cut out, half on each side of the sighting line, the ends of which still show above and below the opening. A wooden stick or cane is next placed vertically in the middle of the hole and the men then continue breaking away the brickwork on each side, with the stick always in the middle of the hole as it grows. Then the stick begins to quiver. This is the critical moment, when the chimney is about to crash. The men knocking out the bricks immediately run clear, and the entire mass leans majestically over and finally crashes to the ground along the line marked out for it.

In the lower illustration on this page a huge stack in Belfast is seen being brought down in this manner, and the "mushrooming" that takes place at the base of the stack is well shown. The houses in the background appear to be in danger of being crushed, but the falling column simply laid itself down in the field.

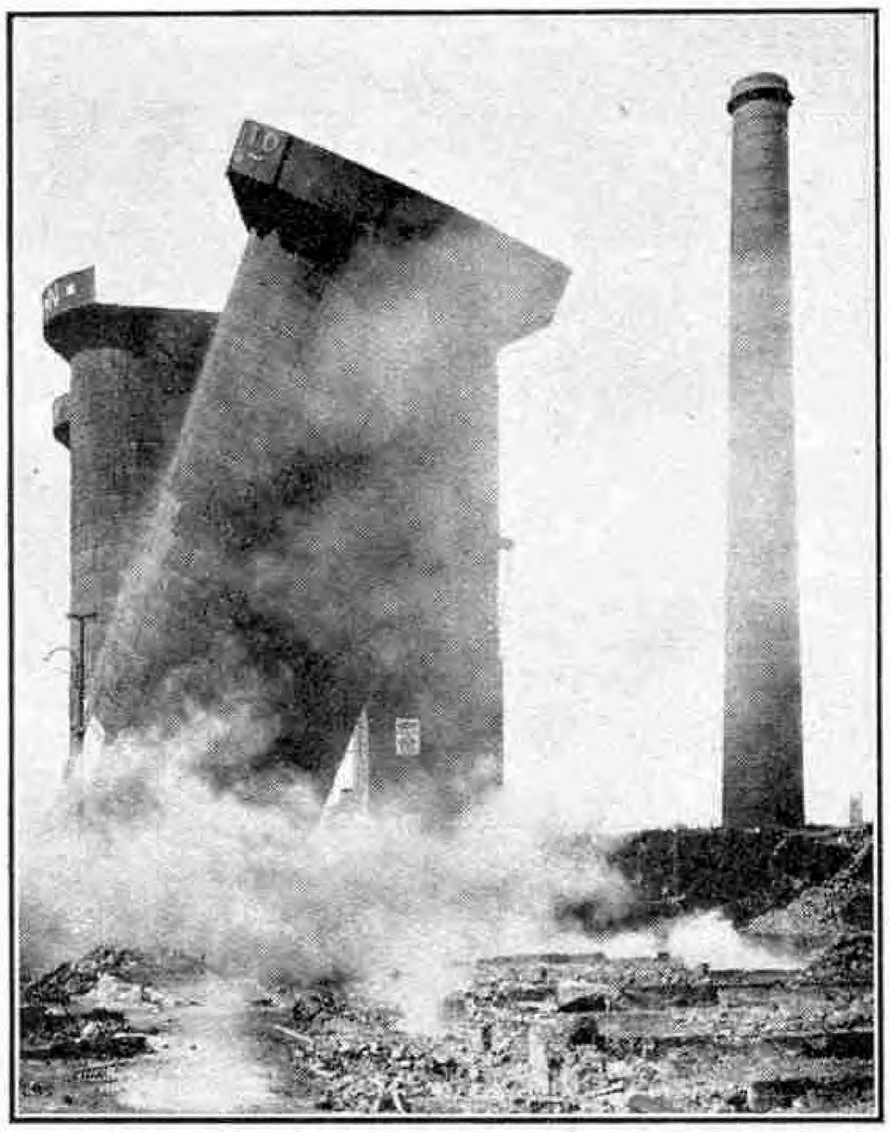
This method of felling chimneys is the safest known, and a sound stack should fall without mishap in the area prescribed for it. The bricks are not scattered indiscriminately in a heap, although the stack itself may be broken up into sections. Occasionally a stack will "corkscrew" instead of simply falling over straight, but a chimney that has been soundly constructed will not do this.

There are times when it is impossible to bring down a chimney stack by this drastic method, and then it must be taken to pieces brick by brick, starting at the top. This is clearly necessary with stacks surrounded by buildings, or where highways do not allow the marking out of a line of the necessary length along which the chimney can be allowed to fall. This method was followed with a chimney 210 ft. in height in Lancashire. This was a veteran, nearly 100 years old, around which buildings had grown up, so that it was practically hemmed in. A road had even been constructed past its base, and the flues

from the boiler house actually ran under the highway. The walls of the chimney were nearly 6 ft. thick, and a petrol road breaker was hoisted to its top to allow the brickwork to be demolished with greater speed than was possible if hammer and pickaxe alone were used.

The wide range of work involved in general demolition is well shown by the remaining illustrations on these pages, which are typical of operations carried out by George Cohen, Sons and Co. Ltd. Work of this kind, whether the demolition and dismantling of heavy plant or ships, bridges, gasholders, etc., naturally yields large tonnages of scrap iron. So one frequently finds that firms such as George Cohen, Sons and Co. Ltd., which was founded more than 100 years ago, are also scrap iron and metal merchants. To the man in the street "Old Iron" is merely "Old Iron" and he mentally leaves it at that; but from the merchant's point of view, there are actually more than 200 varieties of scrap iron and steel and, since the material generally comes to his depots in a mixed or conglomerate state, it has to be very carefully separated and sorted. For each grade of scrap there is a distinct use, but nothing is wasted, practically everything finding its way back into some new iron or steel product. In the iron and steel trade it is almost impossible to build without destroying, and roughly 70 per cent. of any new steel product has already gone through a previous existence as some finished article.

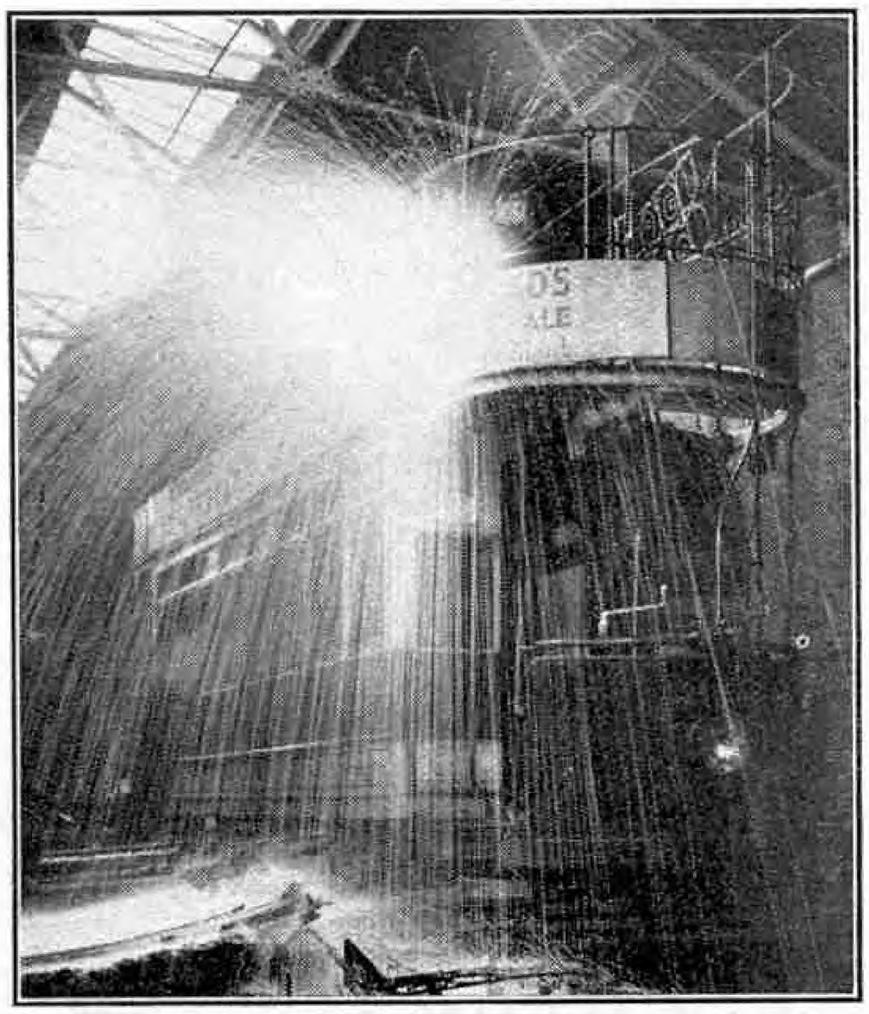
Scrap iron clearly deserves a better name and reputation, since it is indispensable to the world's iron and steel industries. The story of its supply to the steelmaker is a romance in itself, full of unusual happenings that are unsuspected by those not familiar with the business. Suppose that a large electric power station becomes useless, possibly because it is out of date. It is bought by a firm such as George Cohen, Sons and Co. Ltd., whose trained and experienced men begin to break up the huge masses of cast iron that form part of the generators, and to cut out hundreds of tons of steel of various kinds from boilers, hoppers and gantries. Everything is carefully sorted after being broken up, and in particular every fragment of brass, copper, gunmetal or other non-ferrous alloys is carefully removed. Finally the whole of the building itself is demolished and the site cleared. If necessary explosives are used on jobs of this kind. For instance, huge blast furnaces included in one demolition scheme were toppled over by exploding charges of dynamite under their supports on one side.



Demolishing blast furnaces at a Lincolnshire steelworks. A charge of explosive was used to make each furnace topple over.

Handling the immense tonnage of scrap that such operations as this yield requires a large amount of space in which to work, and up-to-date plant. This includes oxy-acetylene burners, which are used to cut up lumps of iron and steel that defy other methods. Some large pieces of cast iron are broken up with the aid of a tup, a solid ball of cast steel that may weigh as much as 3 tons and is dropped from a height of about 50 ft. on to the mass to be broken. Such an operation as this requires a special enclosure in order to prevent danger from flying splinters of cast iron. Whatever method is used, the lumps of cast iron are reduced to a size convenient for charging into the steelmaker's furnaces. Shears and other cutting tools also play a part in this, and good use is made of hydraulic presses, which reduce light and bulky iron scrap, such as cuttings and shearings, to about a twentieth of its normal bulk, giving heavy briquettes that are easy to handle.

Tramcars that have become obsolete, or have been replaced by motor and trolley buses, are obvious sources of scrap metal, and are soon disposed of once they have found their way to the scrap heap. The glass, cushions and other marketable parts of a doomed car are first removed, and the body is then pulled over on its side by means of ropes, after which it is set on fire to get rid of the unwanted wood. What remains is a twisted mass of metal, which is then broken up, sorted and made ready for despatch to the steelmakers. The oxy-acetylene blowpipe is largely used in work of this kind, the sheets of metal in the bodywork of tramcars being sliced up as easily as butter, to the accompaniment of vivid showers of sparks.



Another way of dealing with old tramcars. The one shown is being cut up by means of the oxy-acetylene blowpipe.

Tramcars can be run into special sidings to be broken up, and old buses can be hauled to the yard, either by a lorry or even by a horse. Bridges and other large structures have to be dismantled where they stand, however, and this is engineering work, calling for the use of cranes and other machinery. The first step in demolishing an old structure often is to strengthen it, perhaps to hold it up when vital connecting links are broken. An excellent example was the demolition of the Big Wheel at Earls Court, which about 40 years ago was a famous landmark in London. This rose to a height of 300 ft., and the wheel itself weighed 600 tons.

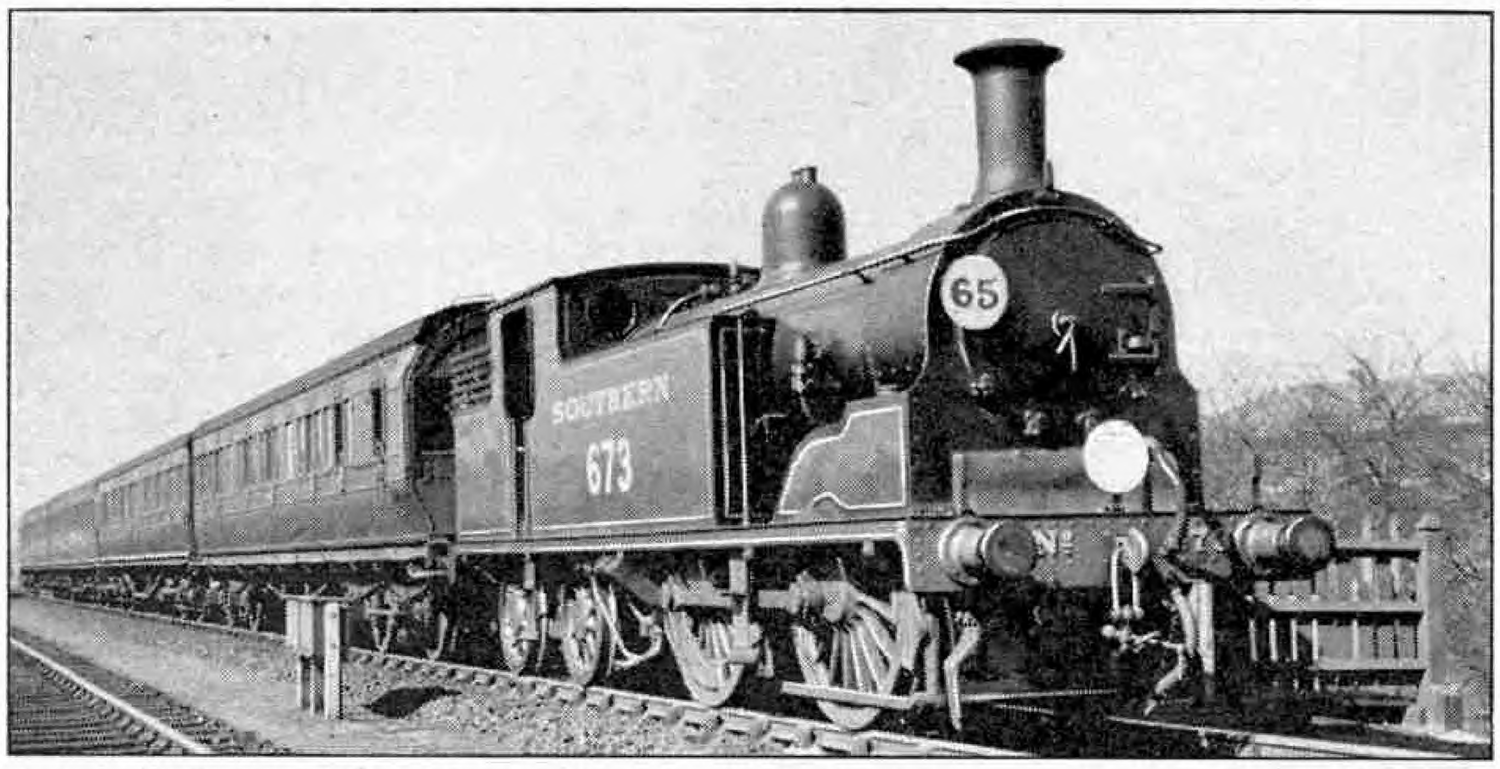
Careful plans were made for dismantling operations and these were demonstrated to the workmen on a wooden model. The wheel was to be cut

(Continued on page 324)



The S.R. "Drummond" Tanks

A local S.R. steam service in the London area is becoming something of a rarity, especially now that the Reading line has been electrified, writes Mr. W. P. Conolly of Battersea. There is however one such service, very nearly the last of its kind, on the West London Extension Railway between Clapham Junction and Addison Road, on which the train shown in the accompanying illustration is engaged.



Former L.S.W.R. M7 class 0-4-4 tank engine, No. 673, on the West London Extension Railway at Battersea. Photograph by W. P. Conolly, London S.W.11.

The engine, No. 673, is one of the original batch of Dugald Drummond's handsome M7 class 0–4–4 tanks introduced on the former London and South Western Railway at the end of last century. They have coupled wheels 5 ft. 7 in. diameter, cylinders 18½ in. by 26 in., and a boiler pressure of 175 lb. per sq. in. Each weighs 60¼ tons in working order. More than 100 of these locomotives were placed in traffic between the years 1897 and 1911, and they have done a great amount of useful work on all parts of the former L.S.W.R. One of the class, No. 126, was fitted with a superheater by Mr. R. W. Urie, but was the only one so treated and was the first of the class to be scrapped.

When the S.R. commenced running their "liner excursions" to Southampton Docks some years ago, so many people arrived at Waterloo for the first trip that the train had to be run in several portions, the last one being worked all the way by one of these engines!

The London district work of these engines now consists mainly of empty passenger train running between Waterloo and Clapham Ford or Durnsford Road Sidings, but a frequent duty is the working of the special train between the Necropolis Station at Waterloo and Brookwood Cemetery, a distance of about 28 miles.

Boy Scouts' Special Tour Train

At Easter 250 Boy Scouts started from King's Cross on a thousand-mile tour by rail of England and Scotland. A special train consisting of sleeping cars, dining cars and kitchens was run, and every scout was served daily with three good meals prepared by expert restaurant car chefs. The train was transformed into a complete travelling camp with a tuck-shop, cinema coach and recreation coach.

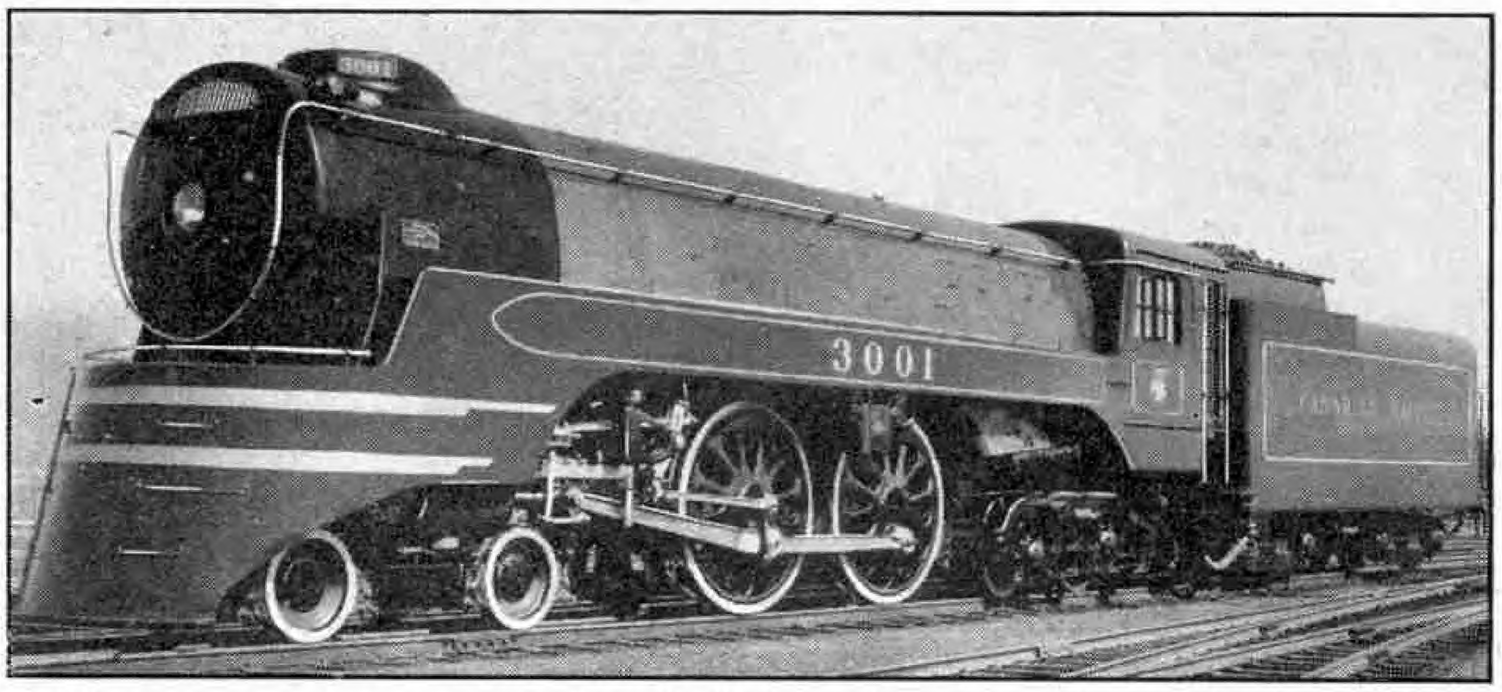
A New American Flyer

A new daily 57-hour through train service between Chicago and San Francisco will be inaugurated in June by the Burlington Route in conjunction with the Denver and Rio Grande Western and the Western Pacific Railroads. The train will be steam operated and will be known as the *"Exposition Flyer,"* thus honouring the Golden Gate Exposition in California and the World's Fair at New York.

Westbound, it will leave Chicago daily at 3 p.m., over the Burlington Route, the departure being designed to afford convenient connections for passengers from the East and South. The train will operate through the spectacular mountainous country between Denver and Salt Lake City on the Denver and Rio Grande Western line and from Salt Lake City to San Francisco over the Western Pacific. It will be ferried across the Bay from Oakland Pier, passing close by the brilliant lights of the San Francisco Exposition on Treasure Island.

Eastbound, the *"Exposition Flyer"* will leave San Francisco at 9 p.m., arriving at Salt Lake City the next evening at 8.15; Denver will be reached the following day shortly after noon, and Chicago on the third day at 11 a.m., making convenient connections with fast trains East and South.

The train will carry through Pullman sleeping cars, tourist sleeping cars, observation-lounge car, and reclining chair cars. All equipment will be air-conditioned and of the latest type, and there will be dining car service for all meals.



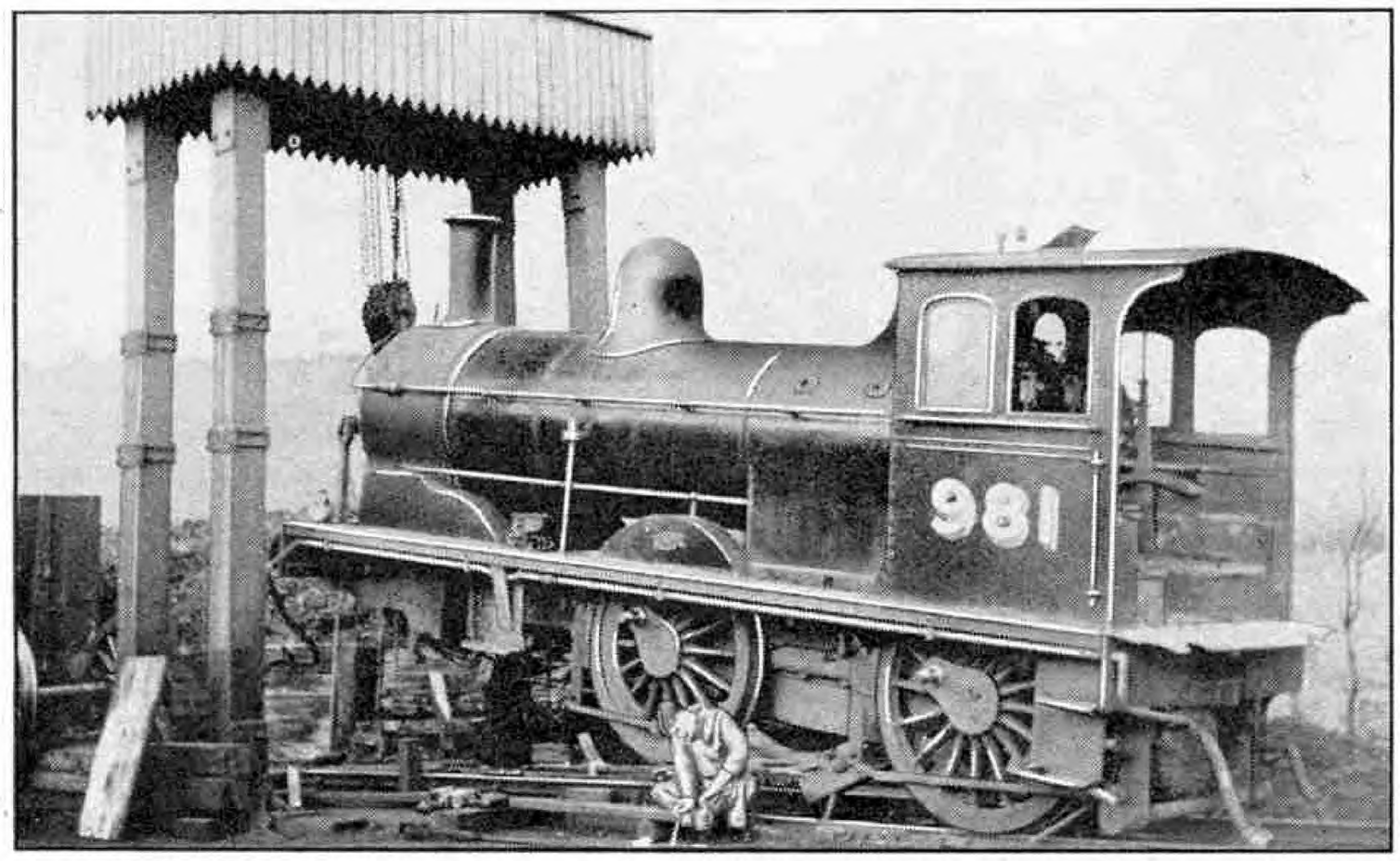
C.P.R. semi-streamlined 4-4-4 locomotive No. 3001. Photograph by courtesy of the Canadian Pacific Railway.

"Facts About British Railways"

The 1939 edition of the booklet "Facts About British Railways" is now available on application to The British Press Office, 2, Caxton Street, Westminster, S.W.1.

The book contains a great deal of very interesting and useful information regarding British railways, the figures contained in it referring to the year 1938. Services and equipment of all kinds are dealt with, and attention is given to passenger and freight services and to the activities of the railways on rail, road, sea and air.

Railway hotels and catering services, electrification schemes, locomotives, rolling stock, track and signals are other subjects, and railway purchases and their effect on British trade, and the variety of employment afforded by the railway also are referred to. A useful railway map is included, the principal routes being shown and marked with the names of various famous trains using them.



Repairs at the L.N.E.R. Kirkby Stephen engine shed. Photograph by G. E. Stone, Newcastle-on-Tyne.

The First Regular Diesel Passenger Train in London

Following experimental runs on the Oxford and Cambridge branches, the L.M.S. streamlined three-car Diesel articulated train recently commenced regular passenger service between St. Pancras, Luton, Bedford, Kettering, Leicester, Nottingham and intermediate stations.

This train was described in the June issue of the *"M.M."* last year. Striking testimony to its hill-climbing abilities was afforded by a recent journey between Bedford and Wellingborough. From the start at Bedford 70 m.p.h. was attained in 2¾ miles. Speed rose to 71 m.p.h. before passing Sharnbrook station at 63 m.p.h., but from this point the 1 in 119 was tackled in impressive fashion, speed rising up 2¾ miles of this gradient to a maximum of 75 m.p.h. The 15.2 miles to Wellingborough were completed in 15 min. 48 sec., a gain of 2¼ min. on schedule.

New 4-8-4 Locomotives for Union Pacific Railroad

The Union Pacific Railroad have ordered 15 4–8–4 locomotives of the "800" class for high-speed passenger and freight services. These will be vastly improved in design in comparison with the 20 similar locomotives that were built in 1937. They will have a boiler pressure of 300 lb. per sq. in., and will be completely equipped with roller bearings throughout. Larger tenders to accommodate 25 tons of coal and 23,500 gals. of water are being provided, the water capacity being 3,500 gals. more than that of their predecessors. The driving and bogie wheels and the wheels fitted to the tender also will be larger than those of the earlier design.

In addition to the new engines the Union Pacific Railroad have ordered several items of rolling stock, and also have taken delivery of new steam turbine locomotives. An additional 4,000 h.p. Diesel-electric locomotive for service on streamliners was placed in service at the beginning of last month on the Chicago-Los Angeles streamliner.



Liverpool to London express hauled by 4–6–0 No. 5574 "India." Photograph by the Rev. E. Treacy, Liverpool.

L.N.E.R. Electric Trains

Passenger coaches for use on their lines now being electrified by the L.N.E.R. have recently been ordered. They will be of all-steel construction and of the open saloon type. Electro-pneumatic doors that can be opened by passengers by means of push buttons are to be provided.

Contracts also have been placed for 100 motor coaches, 100 composite trailer coaches, 100 driving trailer coaches and 100 three-coach electric train equipments.

Work has been in progress for over a year on both the Manchester–Sheffield and Liverpool Street–Shenfield schemes. The Shenfield electrification will cater for an intensive suburban passenger traffic, but the Manchester scheme will provide for all classes of traffic, including very heavy goods and mineral trains.

L.M.S. Locomotive News

Mr. D. S. Barrie informs us that an extensive interchange of 5XP 4–6–0s was effected on the Western Division in March, involving the substitution of "Jubilees" for "Patriots" at the Bushbury and Aston depots. The Euston–Birmingham expresses are now worked by "Jubilees," thus removing the virtual monopoly which "Patriots" have had of this work since the introduction of the 115-min. timing in 1935.

"Patriots" Nos. 5521, 5522, 5523, 5526, 5532 and 5533 have been transferred to Crewe from Bushbury, and No. 5525 to Preston. The "Jubilees" acquired by Bushbury are Nos. 5719 from Preston, and Nos. 5733, 5734, 5735, 5737, 5738 and 5739 from Crewe.

Aston has lost Nos. 5503, 5514 and 5515 to Preston; 5529, 5539 and 5540 to Crewe, and No. 5531 to Willesden, receiving Nos. 5721, 5722 and 5723 from Patricroft, No. 5736 from Willesden, and Nos. 5740, 5741 and 5742 from Crewe. Bescot has acquired No. 5720 from Crewe, in exchange for No. 5507.

The three "Jubilees" transferred from Patricroft to Aston under the above scheme have been replaced by Nos. 5632, 5637 and 5674, all from Preston.

In connection with the King's visit to Lancashire in March the Royal Train was worked from Euston to Golborne, and finally from Stockport to Euston, by "Royal Scot" No. 6114 *"Coldstream Guardsman."* From Golborne to Lowton it was hauled by "Jubilee" 4–6–0 No. 5674 *"Duncan,"* and from Lowton to Chorley R.O.F. Halt, and R.O.F. Halt to Newton Heath by "Jubilees" Nos. 5686 *"St. Vincent"* and 5692 *"Cyclops,"* No. 5686 acting as pilot.

On March 22nd the 4 p.m. express from Euston to Liverpool was made up to 17 vehicles weighing about 500 tons. The Edge Hill "Royal Scot" that normally works this train was exchanged with 4–6–2 No. 6208 *"Princess Helena Victoria"* scheduled for the 5.20 p.m. Liverpool train down.

Marvels of Modern Theatre Lighting

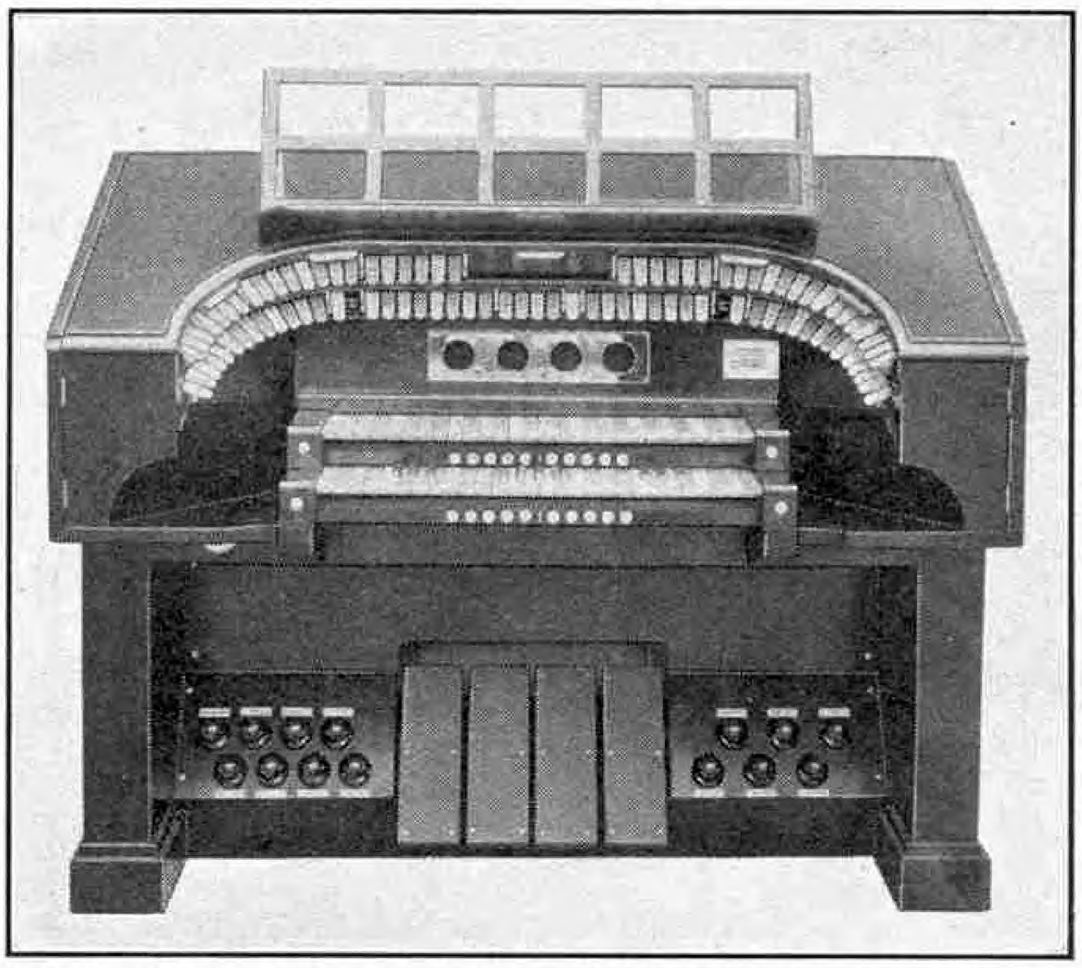
Weird Illusions on the Stage

By Raymond McCullough

THE lighting installation is one of the most essential parts of a modern theatre. Without it none of our present-day scenic effects would be possible, and it is only our ability to create light and shade exactly when and where we require it that divides the elaborate spectacles of to-day from the bare Shakespearian platform.

In designing a lighting installation, the first consideration is to make the actors visible to the audience. Let us try an experiment. Suppose we have a white plaster head on a pedestal, lighted by a single bulb that can be moved about as required. If we try to light the head from the side half the face will be brilliantly lighted all over, while the other half will remain completely dark. Placing the light vertically above the head will produce very intense deep shadows in the eyes, and under the nose and chin, while lighting from underneath will illuminate the hollows of the eyes, the underside of the nose, the cheekbones and the chin in such an unnatural manner that the face will be almost unrecognisable.

On the other hand, if we use four bulbs and light the head from all four directions at once, all the shadows will be destroyed, and the result will be flat and uninteresting. This is the kind of lighting that the old-fashioned theatres had, and the actors originally used grease-paint, apart from make-up for "character-parts," to counteract this flatness by painting artificial shadows and highlights on their faces. Nowadays much less make-up is used, and it is worth noticing that in a photographic studio, where the subject remains in one position, no make-up of any kind is necessary.



A keyboard from which a stage lighting installation is controlled. The necessary effects for up to 24 scenes can be arranged in advance, and each is then brought into action by pressing a single key.

This experiment shows us that the ideal lighting must emphasize the light and shade sufficiently to give the features roundness and solidity, while at the same time a certain amount of even illumination is necessary to prevent the formation of dense shadows. The producer aims to make the "acting area" lighting conform to this ideal as far as he can, while at the same time the lighting must illuminate the scenery adequately, and suggest the atmosphere of the action.

This brings us to the question of scenery. In the old-fashioned theatre, a term that unfortunately applies to most of the theatres in Britain to-day, flat canvas scenery was used as far as possible, and on this the various scenes were painted like pictures, with artificial shadows and perspective. As lighting developed, designers began to see that much more interesting and natural results could be obtained by using solid scenery, which casts its own shadows. The same rules of lighting apply to this type of scene as to the plaster head of our experiment, and most effective results can be obtained from the simplest geometrical shapes. The writer has worked in a small experimental theatre where for many years the only available scenery was a set of large cubes and screens, all painted white. Yet these simple shapes could be endlessly re-arranged and lighted to suggest any scene.



A scene projected on the cyclorama of a modern theatre. The illustrations on this page are reproduced by courtesy of the Strand Electric and Engineering Co. Ltd., London.

The old-fashioned backcloth has been replaced by the "cyclorama," a curved plaster dome that fills the whole back of the stage, and curves round towards the front. This presents an unbroken, smooth white surface to the audience, and when floodlighted evenly in colour gives an almost perfect impression of infinite space. At the Royal Opera House, Covent Garden, the plaster dome is replaced by a semicircular white cloth, which completely surrounds each scene and is rolled up electrically during scene-changing.

To be properly effective a cyclorama must be able to simulate sunsets, summer skies, or futuristic and imaginative colourings with equal efficiency. This is done by means of system known as "colour mixing," in which red, green and violet, the three primary hues of light, are blended in varying proportions to produce almost every other known tint and colour.

Suppose we take three sets of floodlights, and fit each set with transparent gelatine filters corresponding to the three primary colours. Now we connect each set of lamps to the electric supply through a resistance or dimmer, so that we can vary the intensity of each colour at will. The lights are directed on to a plain matt white surface. With both red and green lamps turned on at once we obtain yellow; if the red is gradually reduced the colour of the mixture becomes more of a primrose, but leaving the red full on and reducing the green gives more orange. From a mixture of green and violet, without any red at all we obtain a peacock green, or turquoise; while violet and red together produce magenta, which changes to a deep lavender with reduction of the red to a glimmer. All three colours full on give a pinkish white, and other mixtures of all three colours yield a series of pale or pastel tints such as pink and sky blue.

It should be noted here that white light can never be "coloured" by using a transparent gelatine or glass filter. What happens is that the filament of the lamp produces white light, part of which is absorbed as it passes through the gelatine. For instance, a red gelatine absorbs the green and violet rays, and transmits the red rays unaffected. In the same way any red object, such as a letter-box, appears red to our eyes because it absorbs the green and violet rays in sunlight and reflects the red rays.

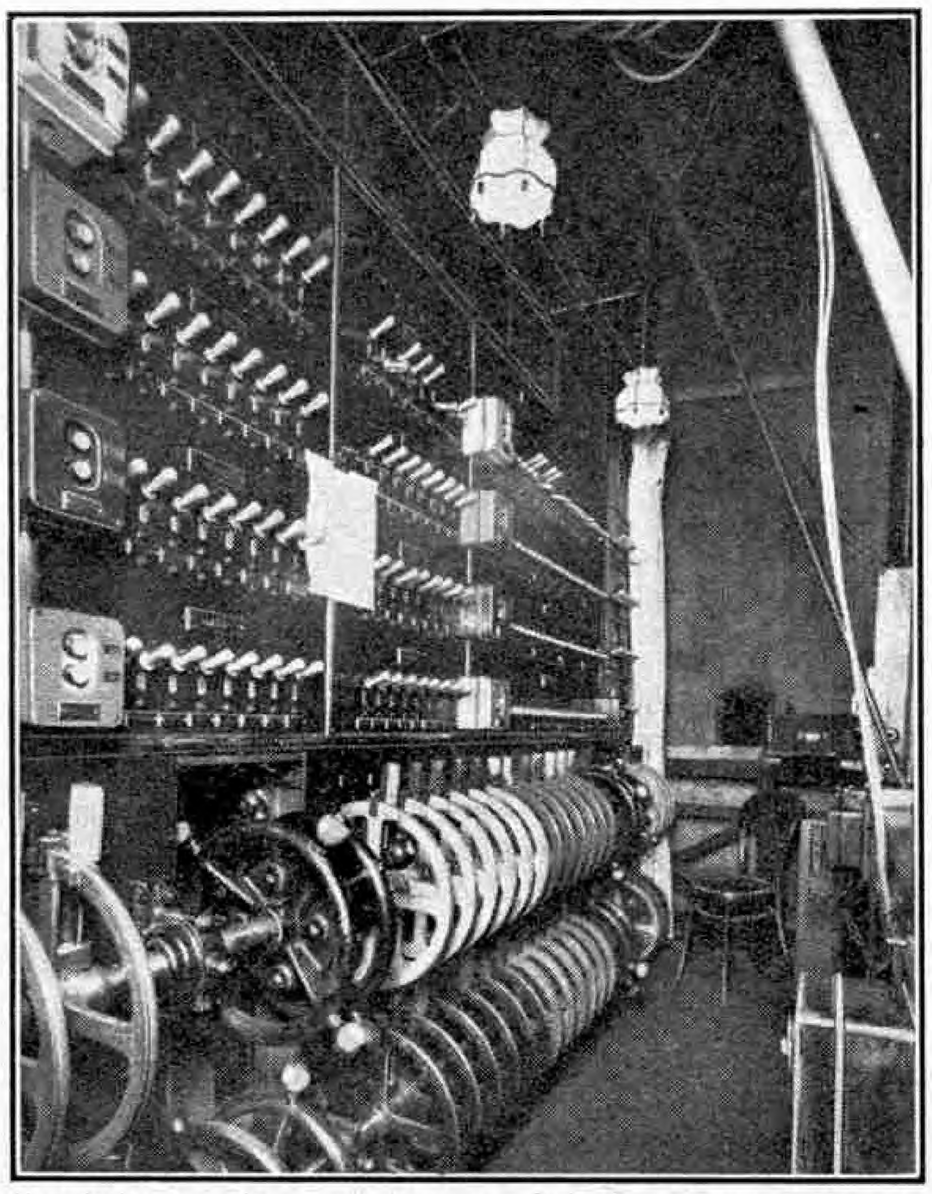
On a stage where coloured light is employed extensively in this way the dimmers play a very important part. The simplest type of dimmer can be made by any handyman. It consists of a jam-jar, at the bottom of which is a flat metal plate connected to one pole of the electric supply; the other connection from the supply goes direct to the lamp or lamps by way of a switch, and from the other side of the lamps connection is made to another plate in the dimmer. This plate can be moved up and down in the jar, which is half full of water to which a small quantity of salt has been added to increase the conductivity. The lamps glow at full brilliance when the two plates

touch at the bottom of the jar, and become dimmer as the top plate is gradually withdrawn. The proportions of salt and water are varied until a perfectly smooth result is obtained. The stronger the solution, the less the dimming effect and vice versa.

The liquid type of dimmer is still used to-day in many of the older theatres. It is very inconvenient for professional work, however, and is dangerous when used on mains voltages owing to the difficulty of insulating the various parts properly. Consequently the standard modern dimmers consist of wire-wound resistances carefully graded to produce smooth and flickerless dimming. It is usual to mount these in racks behind a switchboard, and to operate them by levers from the front, so that no electrically live connection or switches can be touched accidentally by the operator.

In the ideal installation a separate dimmer would be provided for each colour in each piece of lighting equipment, but usually this is not entirely possible. The dimmers are arranged in groups corresponding to the colours they control, and often each lever can be clutched on to a main shaft, so that large groups of dimmers can be operated simultaneously. This principle has been extended at the Covent Garden Opera House, where the installation comprises 150 dimmers. These are mounted in racks in a room under the stage, and each is connected to a single main shaft by means of a magnetically-operated reversing clutch.

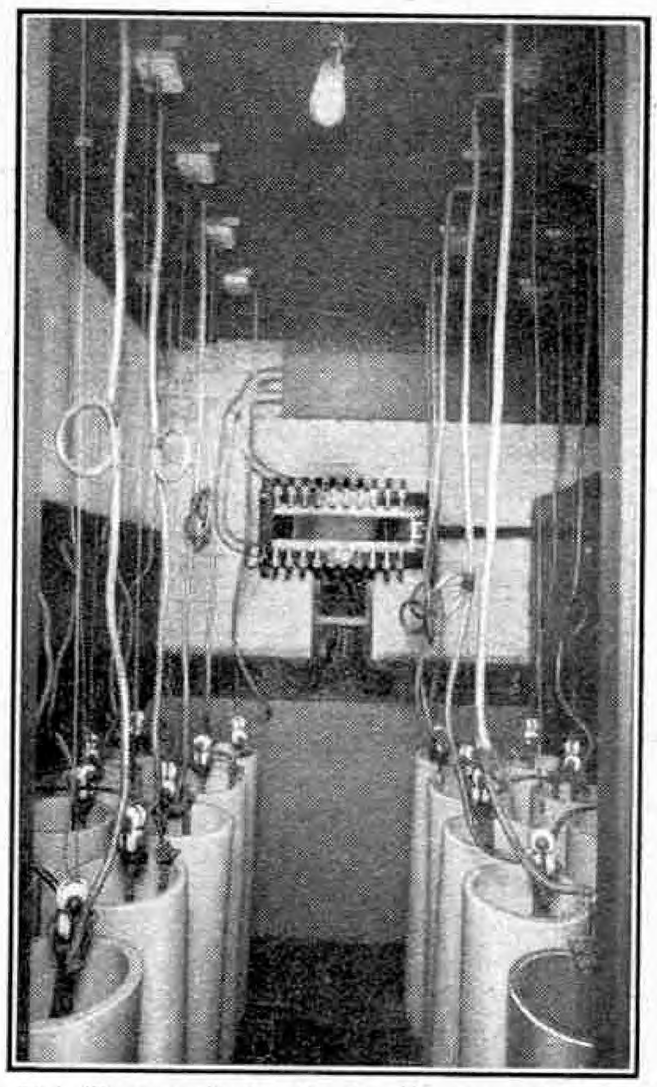
Another type of motor-operated control consists of a bank of dimmers actuated by magnetic clutches, as at Covent Garden, but in this case the lighting operator works from a keyboard similar to that of a cinema-organ. The keyboard is connected to the installation by a flexible cable, so that the whole of the stage lighting can be manipulated from the auditorium during rehearsals, or from any other position to which the keyboard can be conveniently moved. Among other advantages, this system permits the whole of the stage lighting to be set up in advance for 24 scenes. Thus if a particular play contains 24 alterations in the lighting effects, these can be arranged beforehand on the keyboard. When the first scene is finished, the operator has only to press a single key, to cause the dimmers to progress automatically at any pre-arranged speed to the next scene, and so on till the end of the play. A special form of notation, similar to music, has been developed for use with the keyboard, so that the exact sequence of all the lighting effects can be noted as a rehearsal proceeds, and reproduced accurately when required.



The lighting switches and dimmer controls at the Empire Theatre, Liverpool. This illustration and the one below are reproduced by courtesy of Moss Empires Ltd.

Now let us consider how the equipment is arranged on the stage. At the front edge of the stage platform, we have the footlight. Nowadays, this consists of a metal trough divided into 8 in. compartments, each containing a reflector to throw the light forward, a 100-watt or 150-watt lamp, and a gelatine colour screen across the front. When the installation is designed for colour mixing the compartments usually are alternately red, green and violet. On some of the more elaborate stages, the whole footlight can be made to sink into the floor electrically, so that the stage is left clear. This is often important in Shakespearian productions, in which the actors are frequently made to enter from the orchestra.

Immediately behind the proscenium opening is the main lighting for the acting area. This may consist of another trough similar to the footlights, called in this case a "batten," or in larger theatres a row of 1,000-watt floods and spotlights may be used and these can be directed individually on to any portion of the stage. Several more battens may be used, according to the depth of the stage, and the back one illuminates the cyclorama. In large theatres, such as Covent Garden, the cyclorama is so large that a special bank of floods is reserved solely to light it up. In this case, there are 150 floods, each of 1,000 watts, divided among the three primary colours. They are mounted on a steel framework that can be raised and lowered on a counterweight system. Additional floods for illuminating the bottom of the cyclorama are mounted on movable trucks so that they can be rolled away during scene-changing. The installation is completed by flood and spotlight trolleys in the wings, and by powerful spotlights from the auditorium to assist in lighting the "acting area."



The dimmers at the Empire Theatre, Liverpool.

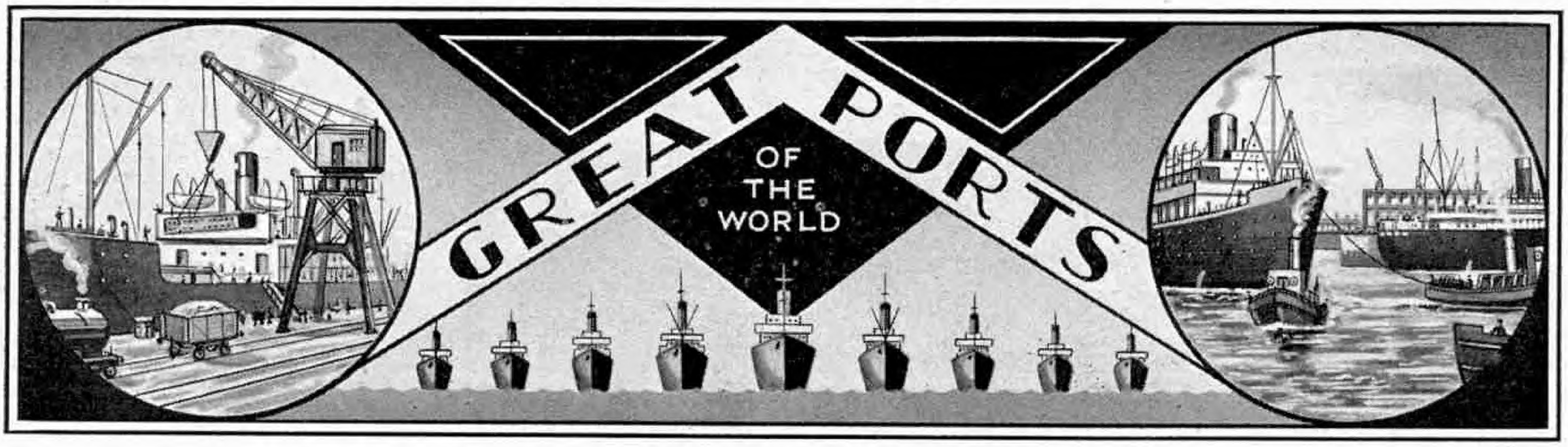
Besides the almost infinite range of colours and scenic effects which are obtainable from such an installation, a number of very useful illusions are possible, the most common being associated with the cyclorama. Special types of cinematograph lanterns are used to project on to it the effects of clouds, flames, rain, and flowing water, and in more elaborate installations complete scenes can be projected on the background in the manner of a "magic" lantern. Very effective use also can be made of gauze curtains. For instance, suppose a picture of moving clouds is projected on to the front of a gauze curtain. The stage will appear to be filled with clouds, and anyone behind the curtain will remain invisible so long as they are not lighted. If, say, a group of angels is called for in the theme of the play, however, they can be made to appear very effectively by placing them immediately behind the gauze curtain and lighting them by a spotlight. The audience will see the clouds as before, but at the same time the angels apparently walking about among the clouds will be visible through the gauze.

Another very effective illusion can be produced with the aid of the ordinary acting area lighting. Suppose pieces of red and white paper are placed side by side in the middle of the stage. If we switch on only red light, the red paper still remains red, but the white paper also will appear red and therefore will be indistinguishable from the red one. Suppose we turn on only blue light instead of the red. The white paper will appear blue; but the red paper cannot reflect blue light, and consequently seems to be black.

We can work out a card-trick on these lines. A giant playing-card is made with the ace of spades painted on it in transparent water-colour in red instead of the customary black. The six of clubs is then painted in blue on the same card. In blue light the white portions of the card will appear blue, and will be indistinguishable from the blue six of clubs, which will consequently remain invisible. The red ace of spades will appear black however. As soon as the lighting colour is changed to red the reverse takes place; the six of clubs is seen in black, and the ace disappears.

On the same principle, an actor's face covered with red greasepaint looks normal in red light, but as soon as the lighting is changed to green, the paint turns black and he becomes a nigger minstrel! Still more elaborate effects have been obtained in which a complete back-cloth was changed from an English countryside scene to one in a Moorish Palace merely by altering the colour of the lighting.

Another class of effect that has been extensively developed recently employs the invisible ultra-violet rays, which make certain substances luminous, or "fluorescent." The rays are obtained most conveniently by using a mercury arc lamp in which all the visible rays have been filtered out by a specially designed black glass screen. A whole stage flooded with this lamp will appear completely dark, but if a man walks on wearing a coat treated with fluorescent paint, the coat will become brightly lighted, and will appear to move by itself, the man inside remaining invisible. Many "invisible man" illusions can be done in this way, and in a recent London production the Indian Rope Trick was presented by a similar method.



THE PORT OF SYDNEY

ON the coast of New South Wales, Australia, there is one of the finest and most beautiful harbours in the world. It is entered from the Tasman Sea through a deep mile-wide inlet flanked by great sandstone cliffs, the famous Sydney Heads, and extends inland for 13 miles, with its foreshore broken into so many bays and headlands that its coastline totals 188 miles. Astride several of these bays on the south side of the harbour is Sydney, the first and chief port in Australia.

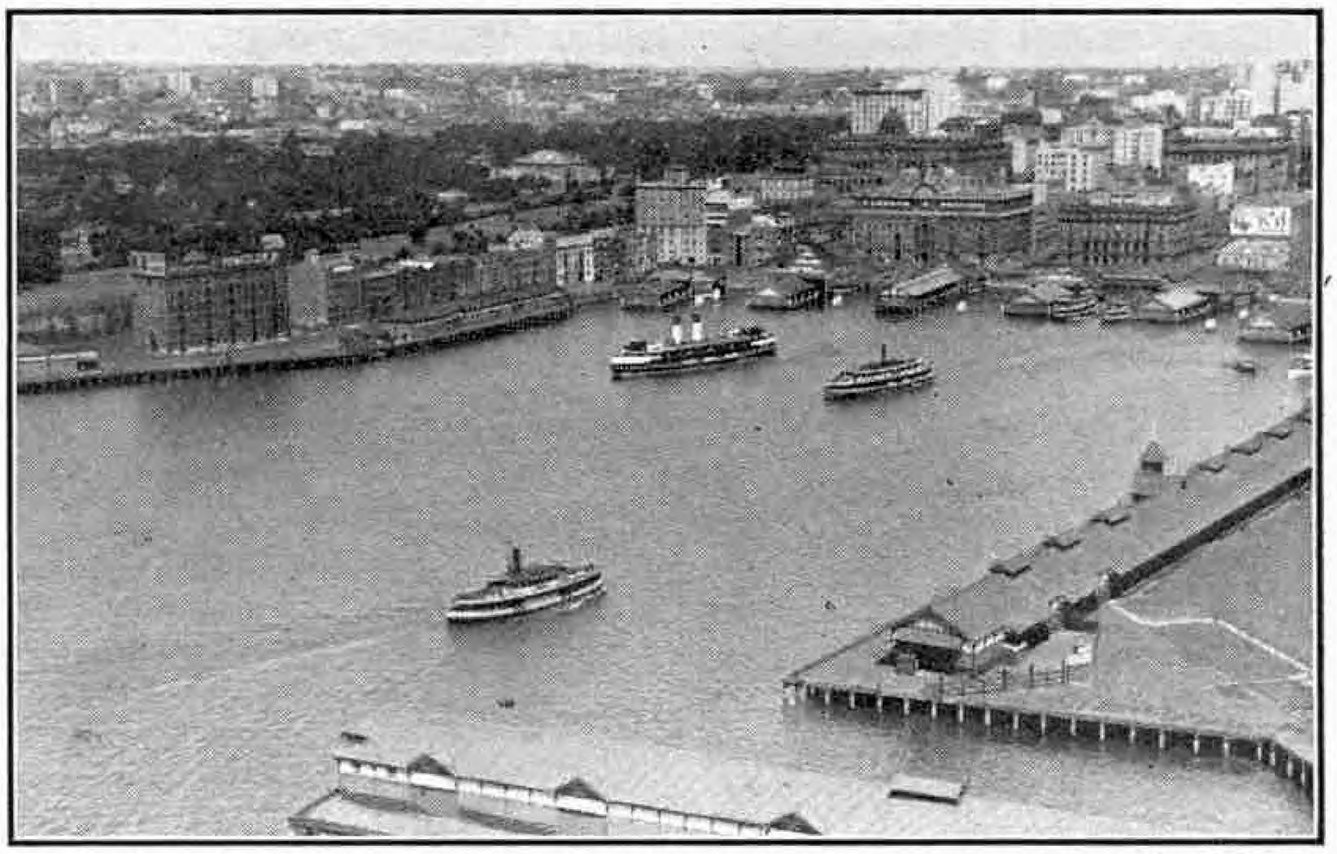
The inlet leading to this harbour and the site of Sydney was noticed by Captain Cook when he charted the east coast of Australia in 1770. He named the coastal territory "New South Wales," seeing in its contour a resemblance to the coast of Glamorganshire, South Wales, and the inlet he named Port Jackson, after the then Secretary to the Admiralty. Cook did not explore the inlet, perhaps assuming that it was only a shallow cove like others along the coast, and the fine harbour to which it leads was not discovered until 18 years later, the beginning of the history of Sydney.

Late in 1787 Great Britain began the colonisation of Australia, and appointed an officer named Captain Phillip to be Governor and Captain-General of New South Wales, then comprising the whole of Australia and the island of Tasmania. He arrived at Botany Bay, 13 miles from Port Jackson, on 18th January 1788 with a fleet of 11 ships, consisting of the "*Sirius*," a 450-ton frigate armed with 20 guns, a tender named "*Supply*," six transports, and three store ships. On board were a total of 1,100 persons, several hundred of whom were to settle in this new land. Phillip chose Botany Bay because it had been greatly praised by Captain Cook, its discoverer, but he found that it lacked shelter from the easterly winds, that it was shallow, and that ashore the supply of fresh water was very meagre.

On the 22nd January Phillip and a small party set out in a rowing boat to find a more suitable place to establish a settlement. By early afternoon they reached Port Jackson, and entering, discovered the harbour, which later was described as being so large that in it "a thousand sail of the line might ride in perfect security." Phillip selected a small deep-water cove on the south side and about four miles up the harbour, as it had the best spring of fresh water, and his ships could anchor close to the shore, which was such that quays "at which the largest vessels might unload" could be constructed there at small cost. He named the cove Sydney, after the then Secretary of State for the Colonies, and within four days he had the whole fleet brought round from Botany Bay and snugly anchored in the cove. This historic arrival of the settlers there is still recalled annually, and 26th January is celebrated as Anniversary Day. On the shore of this welcome cove, Phillip established the first white settlement in Australia, a hamlet of about 300 people, and thus Sydney came into existence.

In those days Sydney Cove ran much farther inland than the Circular Quay that now terminates it. A good deal of the early shipping was done in a fresh-running stream that was called the Tank Stream, at a wharf near where the offices of the State Maritime Services Board now stand. An interesting insight into wharf construction at that time is given by a general order of Governor King, dated 29th November 1803. It states that "the framing, lengthening and planking of the wharf on the eastern side is complete, and the inhabitants are expected to cart material to fill it up and make a way of it." The authorities had another way of getting work done cheaply, and a general order dated 22nd July 1806 declares that "all persons loitering about the wharves will be put to hard labour for the rest of the day."

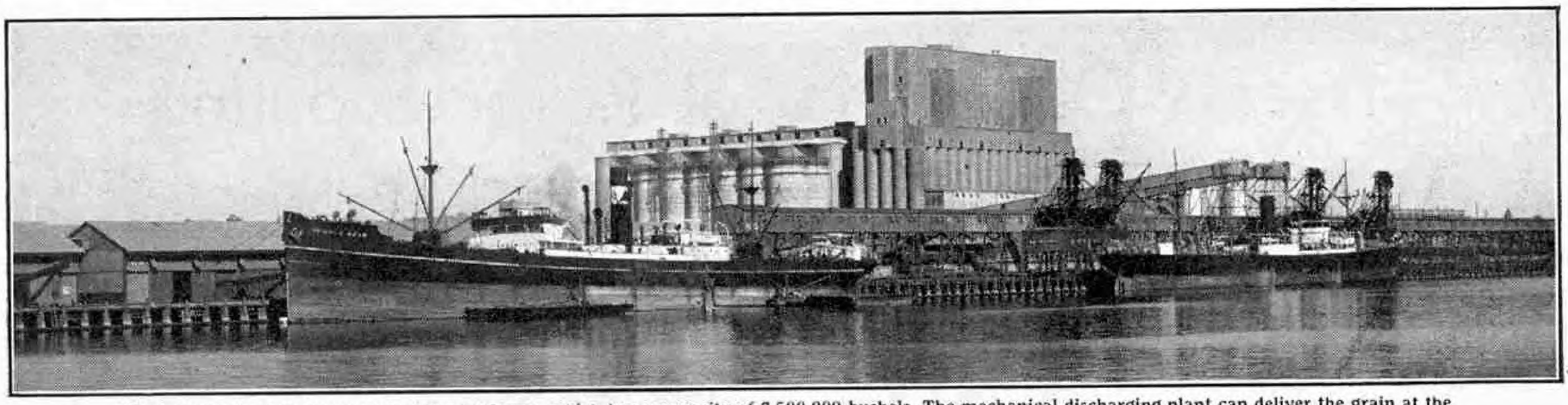
As the years passed many other settlers came to Australia, some peopling areas in the vicinity of Port Jackson and others distant parts of the Australian continent, and of Tasmania. Roads were constructed to link up widely scattered towns, and in 1855 the first railway in Australia was opened. This was from Sydney to Parramatta, a distance of 12 miles. More railways were constructed as the colonisation of the vast country continued.



Circular Quay, Sydney Cove, where the high-decked ferry steamers ply to and from North Sydney, Lavender Bay, and many other places on the harbour. The illustrations to this article are by courtesy of the Agent-General for New South Wales, London.

Sydney increased steadily in size, and its residential areas slowly spread around the bays adjacent to the cove. The port kept pace with its growing overseas and coastal trade. Wharves were erected at Miller's Point, a corner of the headland at the west end of the cove, and along the eastern shore of the next inward stretch of water, then called Cockle Bay and now Darling Harbour. Sydney Cove continued to be the centre of the trade, however, and when the quay wall there became inadequate the authorities made the eastern side of the cove suitable for "thirty ordinary sized merchantmen" to be berthed there. Most of the additional wharves, however, were built to meet the requirements of individual owners, and without any systematic laying-out of the foreshore, with the result that access to many of them was of the most difficult and mazy kind. In fact the general state of affairs became so bad that in 1901 the Government took over the wharves, and the stores and houses in their vicinity, and created a body called the Sydney Harbour Trust to look after and develop the port. The Trust promptly set about re-organising the port facilities, and during the first 20 years of its existence spent over £5,000,000 in remodelling the waterfront, and in providing new dock roads and modern wharfage accommodation.

To-day Sydney is a city of over 1,250,000 inhabitants, and covers a total area of about 150 sq. miles. Although the original territory of New South Wales has been subdivided into several States, Sydney remains the capital of a State 2½ times the size of Great Britain and Ireland, and is still the chief port in Australia. The Maritime Services Board of New South Wales, which succeeded the Sydney Harbour Trust in 1936, controls 68,103 ft. of the 77,601 ft. of wharfage in the harbour. The principal wharves are leased to the various shipping companies whose vessels engage regularly in the trade of the port, and some are reserved for ships

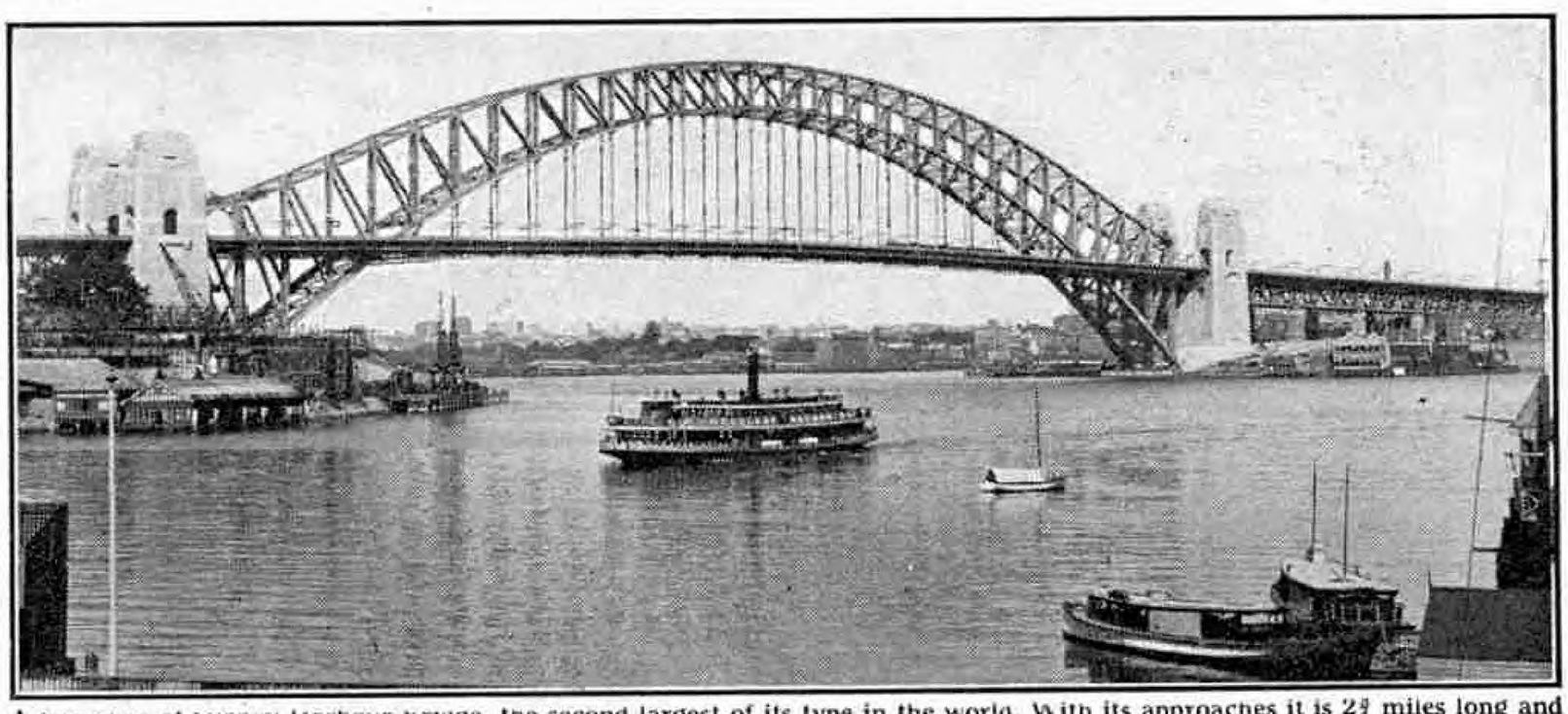


The huge grain elevator on Glebe Island, Sydney, which has a capacity of 7,500,000 bushels. The mechanical discharging plant can deliver the grain at the rate of 1,800 tons per hr. to ships berthed at the adjacent wharves, and up to three ships can be loaded at the same time.

that only occasionally visit Sydney.

Most of the overseas passenger and freight traffic of the port is dealt with at Woolloomoloo Bay, about a mile to the east of Sydney Cove. Circular Quay, the curved waterfront at the inner end of the cove, has a share in this important traffic, and some of the large ocean-going liners engaged in it berth at wharves flanking the quay. The quay itself is the centre of the important cross-harbour ferry traffic, which is still considerable in spite of the great volume of traffic now carried by the Sydney Harbour Bridge. Darling Harbour to the west of, and extending much farther inland than, Sydney Cove, has wharves totalling 6,000 ft., and there are similar facilities at Walsh Bay, at the outer end of this harbour. Glebe Island, the centre of the port's wheat export trade, has a fine grain elevator of 7,500,000 bushels capacity, and special wharves and warehouses for dealing with the large exports of wool and the considerable timber trade.

A very large part of the overseas and interstate trade of New South Wales, and a large volume of coastal trade to and from other ports of the States, pass through the port of Sydney. During the year ended 30th June 1937 a total of 7,295 ships entered the harbour, and their net tonnage totalled 10,993,395, or almost 3,000,000 tons more than the next highest tonnage recorded by an Australian port during the same period.



A fine view of Sydney Harbour Bridge, the second largest of its type in the world. With its approaches it is 2¾ miles long and took six years to build. The massive steel arch is 1,650 ft. in span.

Raw materials form the great bulk of the varied exports of New South Wales, and as the State is the greatest producer of wool in the Commonwealth it is not surprising that this product totals just over half of the export trade of the State. The fine Merino wools obtained are world-famous and are keenly sought by buyers from all the manufacturing countries. Most of the wool is shipped to Britain, France, Belgium, Germany, and Japan. The port of Sydney has special facilities for storing and handling it, and gets the main share of this valuable trade. The wool is brought from the sheep-rearing districts to the port by rail, or by steamer from other coastal ports, and is distributed to wool stores at, or near, the waterside, for sampling and dumping. Several large stores are owned by the Maritime Services Board and are leased by them to wool firms. The largest waterside store at Sydney provides storage for 75,000 bales, and is equipped with electric conveying appliances and hydraulic lifts. A total of 15,000 bales of wool can be put down by a ship's side in 24 hrs. by means of chutes that extend from the upper floors of the store to the wharf. In one season as many as 1,200,000 bales of wool have been shipped from Sydney. Large quantities of sheep skins, with and without wool, are also exported, and 2,333,603 were sent overseas during the year ended 30th June 1936. Most of the skins with wool are sent to France.

The Australian industry next in importance to sheep-rearing is wheat-growing, and here again the port of Sydney is the main outlet for the export of this rich product from New South Wales. Most of the huge annual wheat crop in the State is dealt with by the modern method of bulk handling and storing, and concrete and steel elevators, with a total capacity of 23,123,100 bushels, have been erected at 175 country railway stations in the wheat-growing districts. In a good season these elevators may be filled and emptied three times before the huge crop is disposed of. The grain for export is transported by rail from this country storage to the huge elevator on Glebe Island, or to a much smaller one at the port of Newcastle.

At the Sydney elevator there are ample facilities for receiving the wheat in bulk, and, if necessary, cleaning and drying it before delivering it to ships berthed at adjacent wharves. In the elevator the grain is fed on to wide conveyor belts that run out to the wharf galleries and there tip it on to the travelling gantries. These gantries can lift the grain to the height necessary for spouting it direct into the holds of the ships. The maximum delivery capacity of the elevator is 1,800 tons of grain an hour, and as many as three ships can be loaded at the same time.

Many other products are exported overseas from Sydney, and a great deal of coastal trade with other ports in New South Wales and with the other States of the Commonwealth is also carried on from this port. Large quantities of wheat, flour, sheep, and cattle are shipped to ports in Victoria. Wheat is also sent by sea to Queensland, and butter to Western Australia.

Imports to Sydney are also very varied, and include metals and metal goods, machinery, textiles, paper, foodstuffs, chemicals and fertilisers, oils, bullion and specie. The coastal freight steamers bring to the port cattle, maize, and dairy products from Queensland, and oats, potatoes and fresh fruit from Victoria and Tasmania.

The port of Sydney owes its importance partly to its magnificent harbour, which has a safe entrance in all weather conditions and provides effective protection to shipping. At the Heads the depth of water is not less than 80 ft. at low level, ordinary spring tides. Between the entrance and the harbour proper there are two separate channels and each has a depth of 40 ft. at low tide and a width of 700 ft. The total area of the harbour is about 22 sq. miles, and about half of this is at least 30 ft. deep at low water, ordinary spring tides.

The outstanding feature of the harbour is the giant arch bridge, the second largest in the world, that spans it between Dawes Point, at the outer end of Sydney Cove, and Milson's Point on the northern side of the harbour. This great bridge is 2¾ miles long, including its approaches, and contains 50,300 tons of steelwork, of which 37,000 tons are in the main span. It was built by the well-known British firm of Dorman, Long and Co. Ltd., of Middlesbrough, and took six years to complete, and it was opened for traffic on the 19th March 1932. The massive steel arch is of silicon steel and is 1,650 ft. in span, and the highest point of the top chord is 440 ft. above mean sea level. The deck is constructed of carbon steel and is 160 ft. wide. It carries a centre roadway 57 ft. wide, with a pair of electric railway tracks on each side and a 10 ft. wide footwalk on the outside of each set of tracks.

We are indebted to the Agent-General for New South Wales, London, for the information contained in this article.

Twenty-One Years of Rover Scouting

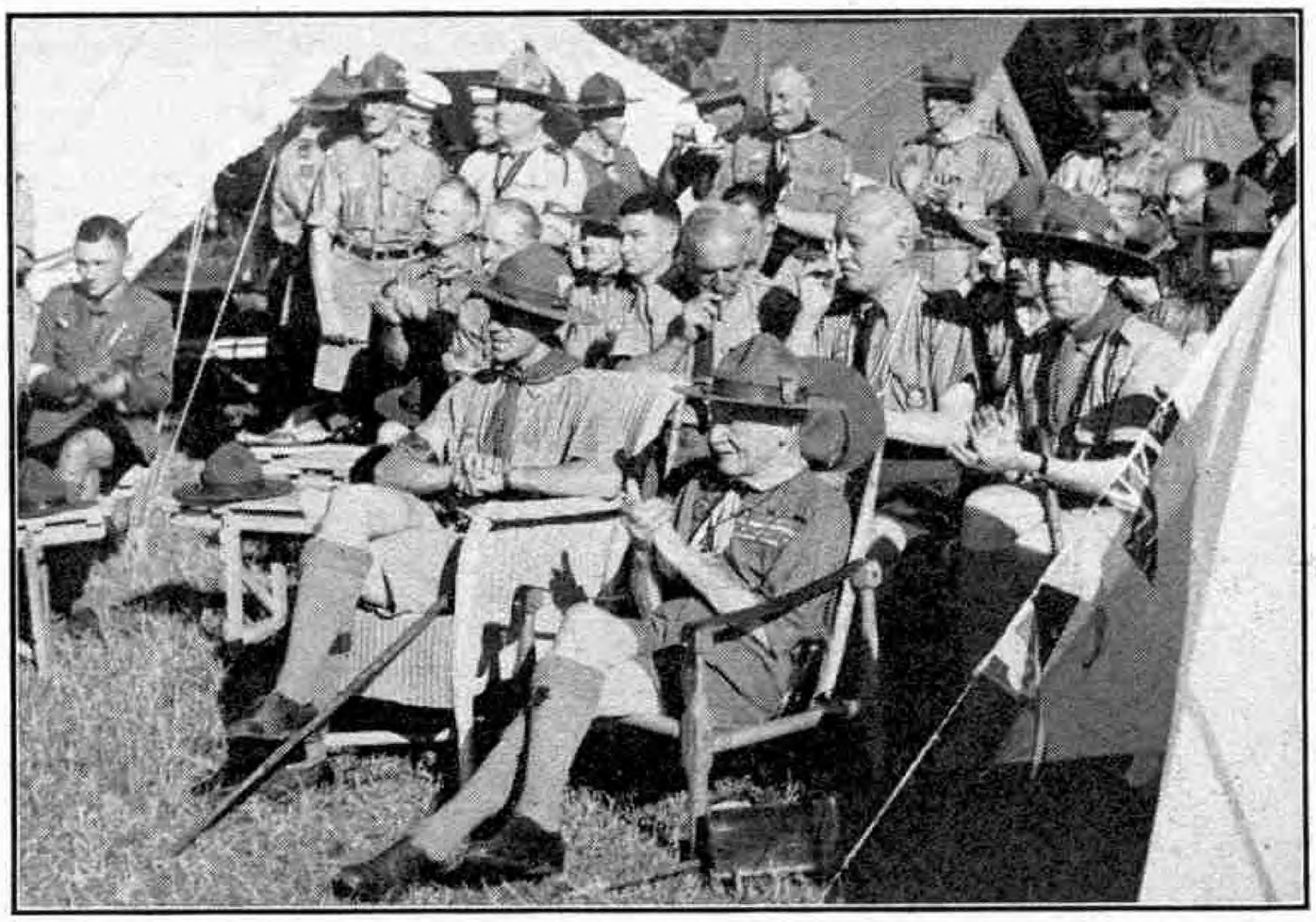
A World-Wide Movement With 100,000 Members

By Alec. A. Purves

IN August 1907 a few boys chosen from all walks of life took part in an experimental camp on Brownsea Island, near Poole in Dorset, under the leadership of General Baden-Powell, as he was then. From this small beginning the Scout Movement was officially started in 1908, and quickly spread to nearly every civilised country in the world. To-day it has a membership of millions.

The adventure, with its camping and backwoods training, immediately appealed to boys, and soon, as they grew older, they wanted to continue it beyond the "boy" stage. Senior patrols and "Old Scouts" sections were formed, and in 1918 the Chief Scout evolved a scheme to meet the special needs of the older fellows. Thus the Rover Scout movement was launched, carrying the adventure into manhood, with a wider interpretation of its aims and ideals.

Rovering spread from a small beginning of a few hundred young men to the present-day world total of 100,000, of which 30,000 Rover Scouts and more than 1,100 Rover Sea Scouts are recorded in the British Isles. To celebrate their coming of age, some 8,000 of these Rovers from all parts of the British Empire and many foreign countries will be present at the third World Rover Moot, to be held at Monzie Castle, near Crieff, Perthshire, from 15th to 26th July.



Prince Gustav Adolf of Sweden and Lord Baden-Powell, the Chief Scout, at the 1935 Rover Moot in Sweden. Photographs by courtesy of the Boy Scouts Association.

Those who have not previously been connected with the Scout Movement may ask what is this organisation that captures the enthusiasm of young men in all parts of the world. Lord Baden-Powell, the Chief Scout, has described it as "a brotherhood of open air and service." It is for men over 17 years of age who are willing to take to the open-air life of camping and hiking, and are prepared to carry out the Scout Law in their daily life. The object of the training is to develop healthy and useful citizens, able to shift for themselves, and equally able and ready to be of service to others.

The unit of Rovering is the "Crew," and may consist of any number of Rovers, under a Rover Scout Leader. The Crew may, if desired, be split into patrols, each under its Rover Mate. A complete Scout Group consists of a Wolf Cub Pack, a Scout Troop and a Rover Crew, but the Crew's activities and training are kept quite separate from those of the rest of the Group, and to this end, each Crew usually has its own "Den," where its meetings can be held. Sometimes the Rover Den is a room adjoining the Scout headquarters; sometimes it is a separate hut, a log cabin, a converted cottage or lodge, an old railway carriage or an old ship. A really enterprising effort has been made by the Scouts and Rovers of Godstone, in Surrey, who have built themselves an "Elizabethan" house of materials from demolished 16th-century buildings. These Dens usually are attractively decorated with Scouting pictures and photographs, relics of foreign camps, items of local historical interest, and coats-of-arms. They are in fact museums of Scouting interest, but "live" museums, with no room for glass cases of stuffed birds or fish.

When a young man wishes to join a Rover Crew he serves a period of probation, during which time he is expected to study the Scout Promise and Law, and Scouting as it is given in the Chief's two books, *"Scouting for Boys"* and *"Rovering to Success."* He also must be able to train a boy of Scout age in the tenderfoot tests. Having been approved by the Rover Leader and the Crew, he can be invested as a Rover Scout. The form of investiture adopted by most Crews in this country is based on the old ceremony of the investiture of a knight, and includes the vigil, to impress on the new member the seriousness of the promise which he is about to make.

After investiture the Rover is expected to qualify himself in various subjects which form the usual practical training of the Crew. This is interesting open-air work, and includes camping, hiking, axemanship, knotting, lashing and splicing, cooking, swimming, and physical training. There is also much to be done at the weekly meetings in the Rover Den. During the winter months interesting programmes are arranged, including yarns and discussions on local and national government, public services, international affairs, and many other subjects, while practical training is given in first aid, boxing, ju-jitsu, and similar activities. Some of this is undertaken by members of the Crew, while frequently talks and training are given by experts outside the Movement. Rover Sea Scouts are particularly concerned also with nautical training, and operate on the coast and on inland waterways.

One of the chief features of Rovering is service for others. Every member is expected to undertake at least one permanent job of service, while most Crews, in addition, undertake special collective jobs. This is, of course, a wider development of the Scouts "daily good turn," a man's interpretation of a feature that has appealed to the boy and the public alike from the very beginning of Scouting.



A party of Scouts in the hills near Crianlarich, Perthshire.

Service within the Movement appeals most perhaps to those Rovers who have had previous Scouting experience; all over the country helpers are wanted, particularly as Scoutmasters, Cubmasters, and Instructors. In addition to running ordinary Scout troops, many Rovers are doing good work in organising troops for handicapped Scouts in hospitals and institutions, and it would be difficult to find happier groups of boys than these blind or crippled Scouts.

Another valuable form of service is performed by those Rovers who take up first aid work, either in conjunction with one of the recognised organisations, such as the St. John Ambulance Brigade, or by the establishment of first aid and dispensary centres, as has been done in Poplar and Nigeria. Blood transfusion is another field in which Rovers have played a prominent part; since 1922, Rover Scouts in London have always topped the list of donors, having given over 700 transfusions a year. This idea has spread to the provinces and overseas, while the provision of skin for grafting, a particularly painful business, has been undertaken by the Rovers in Maritzburg, South Africa.

Other forms of service include the preservation of the countryside, coast watching, acting as hospital orderlies during epidemics, running boys clubs, fire brigade work in rural districts and many others too numerous to mention. One that must be recorded, however, is the heroic work undertaken by Rover Scouts after the Quetta earthquake disaster in 1935. Amid terrible devastation, and in appalling conditions, 1,000 Rovers were quickly at work, bringing relief to the refugees, removing and burying the dead, work that no one else would touch, supplying food and water, and supervising sanitation and other essential services. In this Rovers of all races worked together, Hindus, Mohammedans, Sikhs and Christians, high caste and low, a co-operation that would have been impossible but for the Brotherhood of Scouting, which knows no distinction of class, race, or creed.



Scouts and Rovers at Godstone, Surrey, rebuilding a 16th-century house to form their headquarters.

All these jobs of service are performed by Rovers as part of their duty, without any thought of reward or publicity. Many of the items mentioned have only been heard of accidentally, and it is fairly safe to say that most Rovers would prefer to go about their service quietly and unobserved.

Physical fitness plays a large part in Rovering. Cleanliness of body and mind are essential to produce a good citizen, and in the Rover Movement these are combined with physical training, swimming, athletics and climbing. Recently, the popularity of mountain climbing has increased considerably, and each year many Rovers visit the Scout Chalet at Kandersteg, in Switzerland, for training in mountaineering and winter sports.

Both individually and in team work Rovers have many sporting achievements to their credit, of which but a few can be mentioned here. A Rugby football team, formed from the British contingent at the 1935 World Rover Moot in Sweden, beat the strongest team in the Swedish Rugby Football Association, by 12 points to 3, while in 1937, Rover Scout Hardy Ballington, of Durban, created a sensation by running 100 miles in the record time of 13 hours 21 minutes 19 seconds. In many districts Rovers have strong Rugby, Association football, and hockey teams, and are keen competitors in local swimming, boxing, and other sporting events. Jack Peterson, the famous boxer, is an active Rover, while Jack Lovelock, the "miler," is also an old Scout.

In adventure, as in sport, physical fitness also counts for much, and Rovering can offer adventure to all who want it. In 1935, five Rover Sea Scouts from Cambridge University sailed to Sweden in their schooner *"Moronel"* to take part in the Moot. This year two sailing boats are bringing Rovers from the other ends of the earth to attend the World Rover Moot in Scotland. The larger boat, a 50-ft. yawl, is manned by two Australian Rovers and a Polish Sea Scout, and left Sydney in July 1938. The other adventurers are two Rover Scouts from Malaya, who are sailing a 30-ft. boat. An interesting car-caravan journey was made a few years ago by three Beckenham Rovers who were visiting the Jamboree at Gödöllö, Hungary.

GAUGE 00

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Built to

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realistic railway on y

Hornby-Dublo L
never before achieved
reversing and speed

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The Dublo Tra



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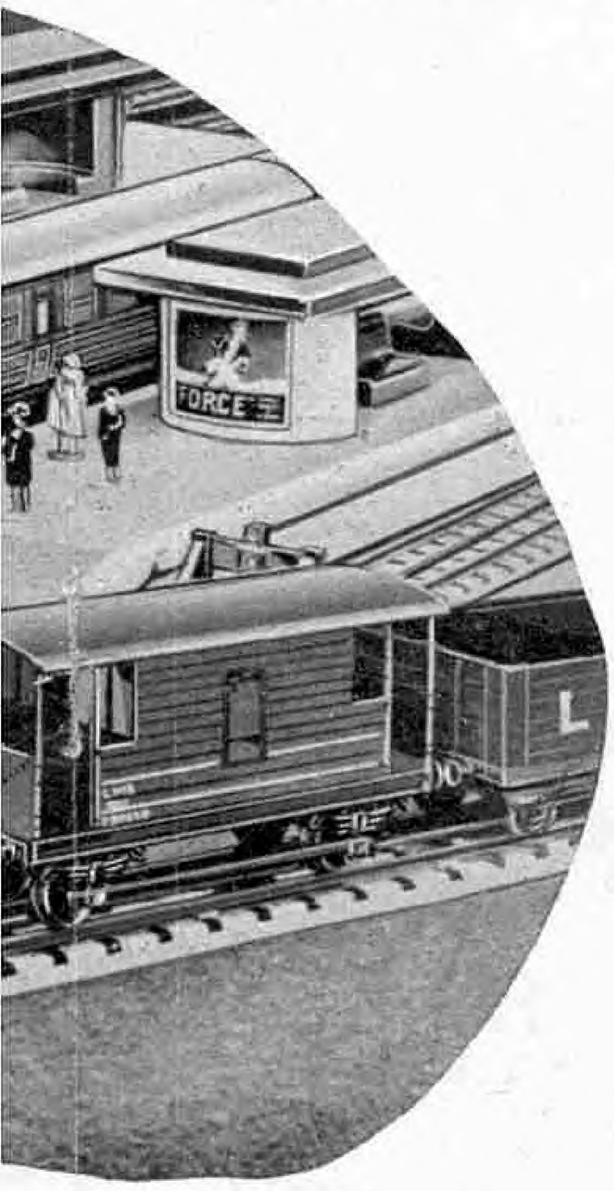
Dublo Locomotives are fitted with motors (either clockwork or electric) of a power and reliability achieved in this gauge. All the movements of the Electric Locomotives are perfect—starting, stopping, speed regulation are all carried out by the movement of one lever.

c couplings are fitted to all Coaches, Vans and Wagons. The Signals are realistic working models of per-quadrant type and the Buffer Stops have working heads.

Dublo Electric Trains operate on **Direct Current** at 12 volts. This current may be obtained either **ating Current Mains Supply** through a Dublo Transformer and a Dublo Controller No. 1, or t accumulator and a Dublo Controller No. 1a.

blo Transformers are specially designed for these Trains; no others should be used.

Write to Meccano Ltd., Dept. DF, Binns Road, Liverpool 13, for a free copy of the special folder giving details of the Hornby-Dublo Railway System.



HORNBY-DUBLO ELECTRIC AND CLOCKWORK PASSENGER TRAIN SETS

ELECTRIC

Hornby-Dublo Electric Passenger Train Set, L.N.E.R. Contains Streamlined Six-coupled Locomotive **"Sir Nigel Gresley"** (Automatic Reversing), Tender, Two-Coach Articulated Unit, Dublo Controller No. 1, seven Curved Rails, one Curved Terminal Rail and two Straight Rails. (To be operated from a Dublo Transformer, not included in Set.) Price **70/-**

Where the mains supply is D.C., or there is no supply, the above Set is available with Dublo Controller No. 1a (for use with 12-volt accumulators) as follows:
Electric Passenger Train Set, L.N.E.R. (With Dublo Controller No. 1a.) Price **61/6**

CLOCKWORK

Clockwork Passenger Train Set, L.N.E.R. Contains Streamlined Six-coupled Locomotive **"Sir Nigel Gresley"** (Reversing), Tender, Two-Coach Articulated Unit, eight Curved Rails and two Straight Rails. Price **39/6**

HORNBY-DUBLO ELECTRIC AND CLOCKWORK TANK GOODS TRAIN SETS

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Electric Tank Goods Train Set, L.M.S., L.N.E.R., G.W.R. or S.R. Contains Six-coupled Tank Locomotive (Automatic Reversing), Open Goods Wagon, Goods Van, Goods Brake Van, Dublo Controller No. 1, seven Curved Rails, one Curved Terminal Rail and two Straight Rails. (To be operated from a Dublo Transformer, not included in Set.) Price **55/-**

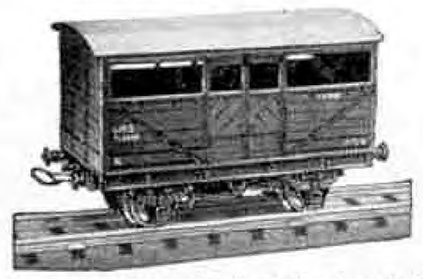
Where the mains supply is D.C., or there is no supply, the above Set is available with Dublo Controller No. 1a (for use with 12-volt accumulators) as follows:
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Clockwork Tank Goods Train Set, L.M.S., L.N.E.R., G.W.R. or S.R. Contains Six-coupled Tank Locomotive (Reversing), Open Goods Wagon, Goods Van, Goods Brake Van, eight Curved Rails, and two Straight Rails. Price **27/6**

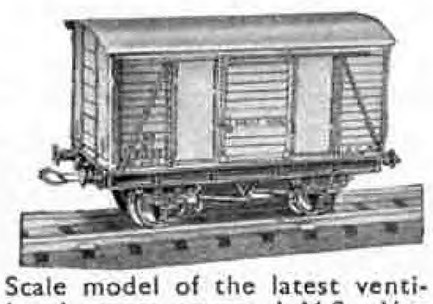
NOW READY

CATTLE TRUCK
L.M.S. and G.W.R.



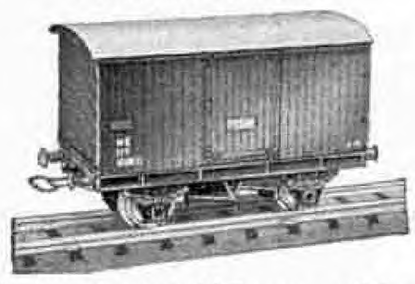
An attractive vehicle, fully detailed and typical of up-to-date practice of the two companies. Price **1/6**

MEAT VAN
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Scale model of the latest ventilated meat vans; L.M.S. Van Bauxite brown and S.R. Van buff. Price **1/6**

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A characteristic N.E. van used for perishable traffic. Finished in red-brown with white roof and lettering. Price **1/6**

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Finished in teak brown with white lettering. Price **1/6**

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Finished in bright red with gold lettering. Price **2/6**

PETROL TANK WAGON
"POWER ETHYL"



Finished in green with gold and red lettering. Price **2/6**

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Variety in Hornby-Dublo Train Working

The Fun of "Doing Things Differently"

IN developing an interesting running programme it is frequently necessary to make locomotives, rolling stock and equipment serve various purposes. To do this is quite in order, and has the further attraction that comes from "doing things differently." It is not essential to keep rigidly to the standard arrangements of Hornby-Dublo Train Sets. The composition of these is a valuable guide to the less experienced operators, but enterprising Hornby-Dublo owners will invariably cast about for methods of working and schemes of development that remove his layout entirely from the "standard" category.

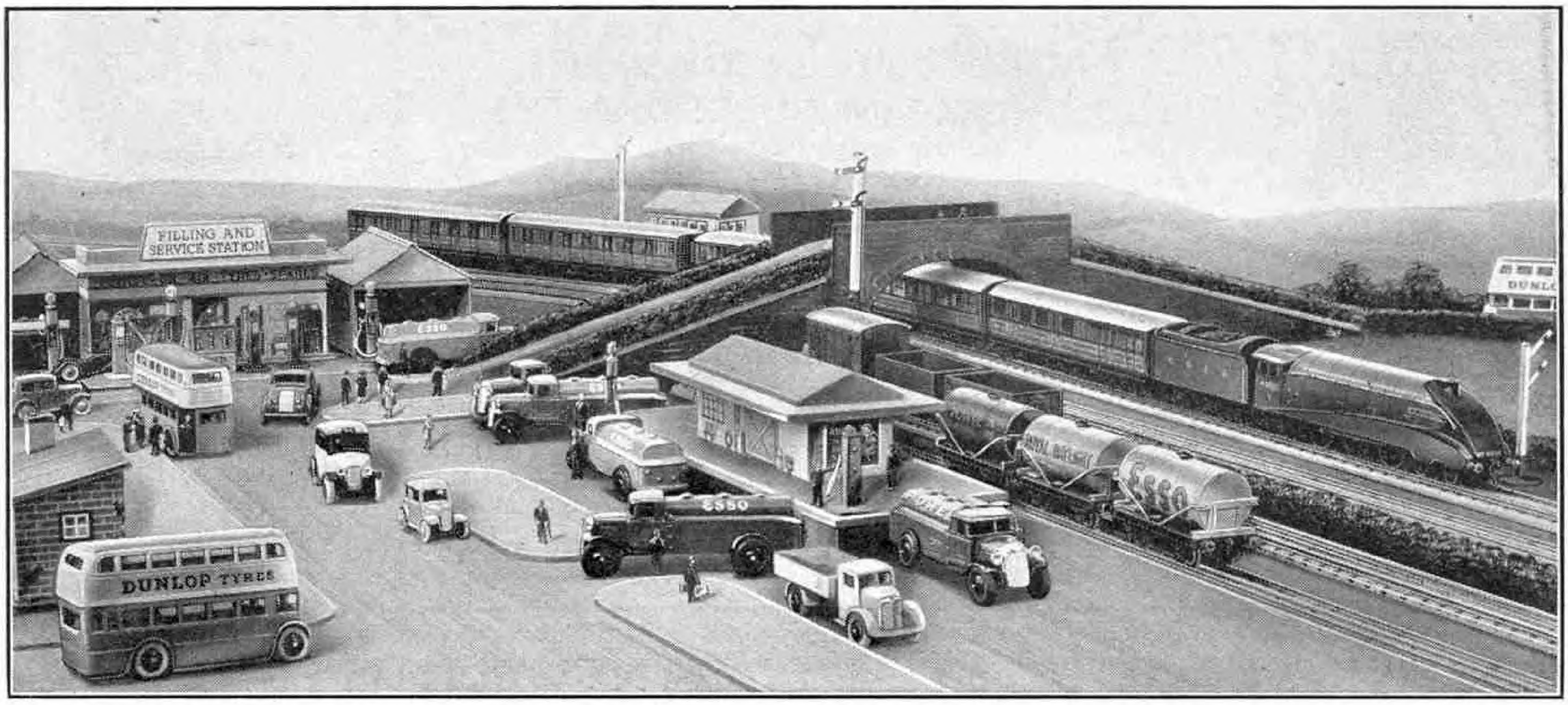
On most miniature railway systems special importance is invariably attached to the working of express passenger trains. In making up trains of this kind the Two-Coach Articulated Unit contained in the Hornby-Dublo Passenger Train Sets of course is used. In addition to the standard Unit a separate eight-wheeled Corridor Coach is available, however, and this also is most useful in the formation of important express trains. The motors of Hornby-Dublo Locomotives, whether electric or clockwork, are so efficient that they will deal readily with an additional coach, and the Corridor Coach therefore can be used regularly in making up these trains.

On some systems space is restricted and comparatively lengthy trains cannot conveniently be dealt with as a regular thing. This Coach can then be attached to main line expresses only over a definite part of the track, or at intervals. For instance, it can be used with advantage to provide a through service to or from some point not served by the main train. An interesting example of this type of working on a Hornby-Dublo layout was given in the article in the February *"M.M."* in which the miniature railway of Mr. V. J. Martin was described.

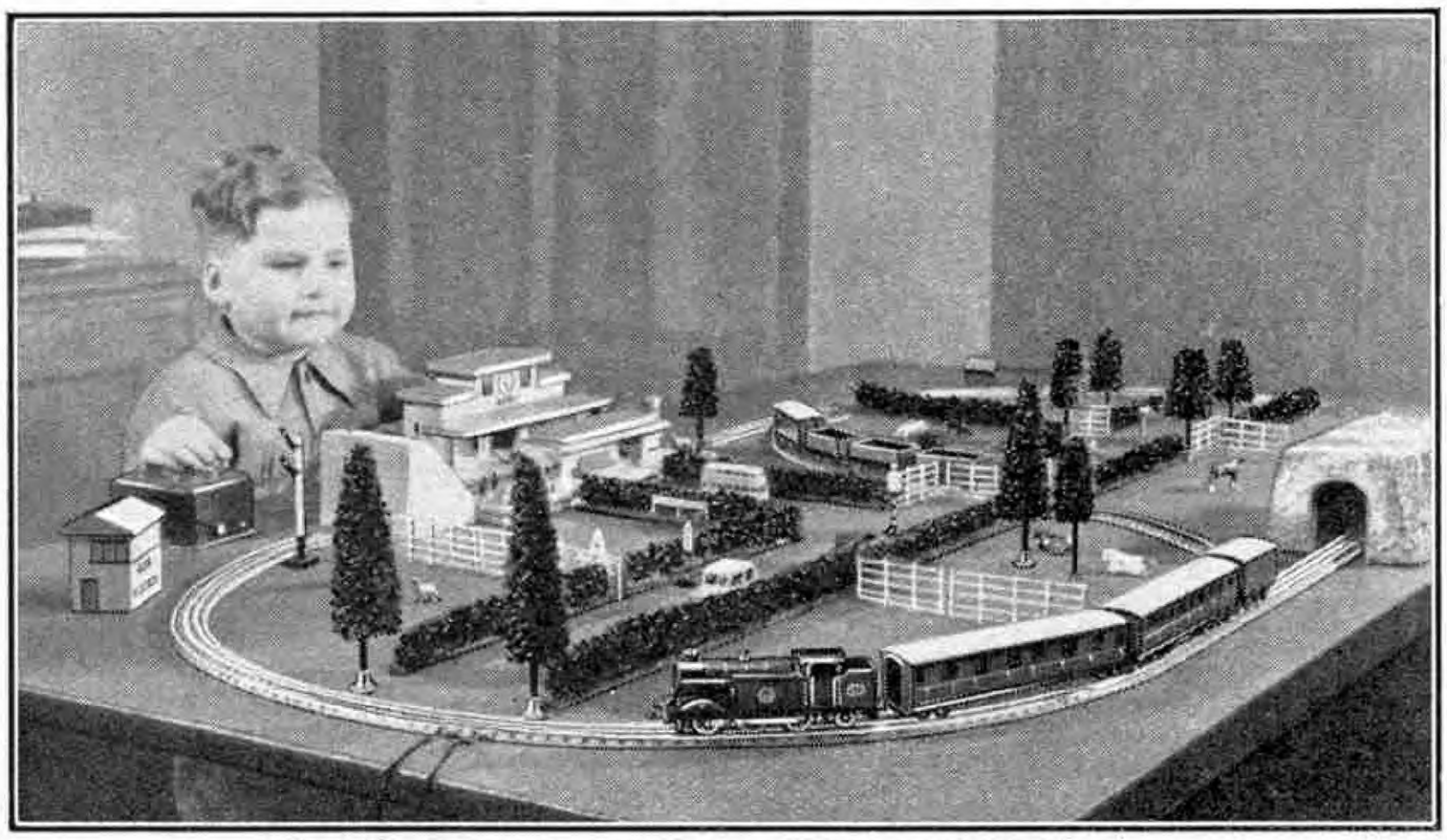
The working of local and suburban train services is often thought to be uninteresting. This is the type of train with which the majority of boys are most familiar, however, and operations can be made very attractive. Intensive steam worked services are run over many suburban lines during the rush periods of the day, and it is easy to imitate similar conditions in miniature. Working of this kind is most enjoyable when the layout boasts an actual terminal station. On an ordinary continuous layout a through station can be used as a terminating point for services of this kind, however, and satisfactory results can then be obtained, provided that the track layout is suitable for the rapid manœuvring of trains and of locomotives.

For intensive suburban work it is an advantage to standardise the train make-up. Sidings and loop lines and running round arrangements can then follow a standard plan, and quicker station working will be the result. From this point of view the use of the Two-Coach Articulated Unit is ideal, and certainly is realistic, for this form of stock is extensively used for suburban work on the L.N.E.R. system. It may not be strictly accurate to employ corridor vehicles for such duties, but the handiness of the "twin" units no doubt will outweigh this in the opinion of the "Operating Superintendents" of most miniature lines.

For ordinary local working the practice of running a tank engine round the train that it has brought into a terminal station, and then coupling up for the return journey, is quite satisfactory. For more intensive operation, however, where the time between arrival and departure is restricted, it is good practice to provide what is known as a "turnover" locomotive. This is an engine that is waiting at the terminus to back on to a train for the return journey. The engine that has brought the train in is uncoupled and then proceeds to a convenient engine road or siding until the arrival of another train, when it then acts as a turnover locomotive, and so on.



A layout that is different. A clever combination of Hornby-Dublo Trains and Dinky Toys. The careful placing of the vehicles makes the scene very realistic.



Barrie Reading enjoys operating his realistic Hornby-Dublo layout.

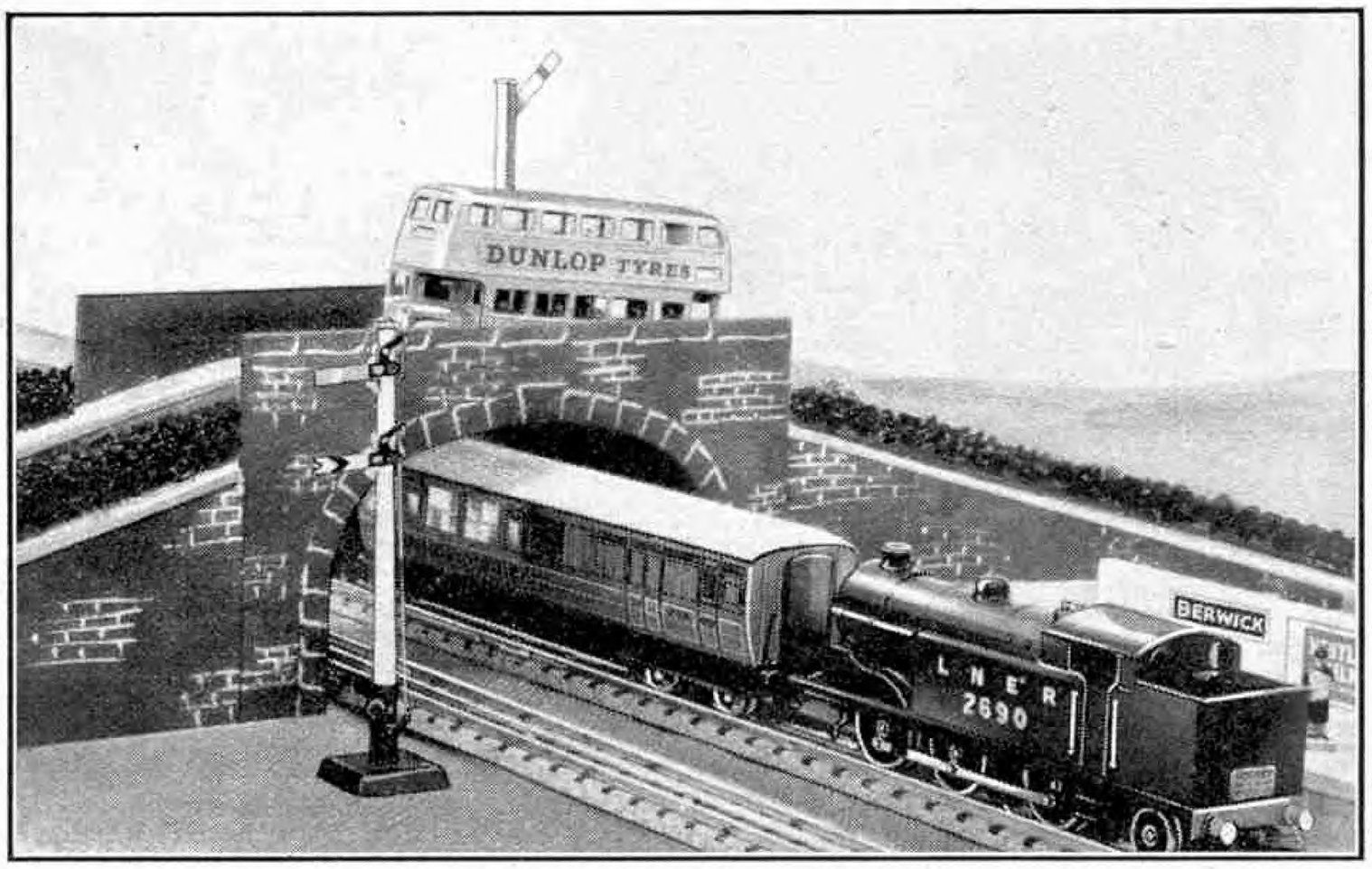
Another scheme that can be followed with success on a Hornby-Dublo layout is to operate a local service by means of a "pull and push" train. This practice avoids the need for a tank engine to run round its train at a terminus. The train, which may consist of only one or two coaches, is pulled in one direction and pushed on the return journey, special arrangements being made to allow the engine to be controlled from the end of the train. On the return journey, when the train is leading, the driver travels in the end coach, leaving the fireman alone on the footplate.

This type of train is particularly suitable for use on a miniature single-line branch provided with only the simplest terminal facilities. No crossovers or even points are required at the end of the journey as the engine simply brings its train in up to the buffer stops, and when the station work is completed the train is run out backwards.

It is not strictly necessary to confine the working of the Hornby-Dublo Passenger Rolling Stock to railways that are operated with L.N.E.R. locomotives. Quite frequently miniature railway owners operate the stock of several companies together on layouts representing some imaginary territory, and this practice gives entertaining running. Barrie Reading, Widnes, the youthful Hornby-Dublo enthusiast shown in the upper photograph on this page, evidently thinks so! He favours the use of the G.W.R. 0–6–2 Hornby-Dublo Tank Locomotive, using this for passenger work with L.N.E.R. rolling stock, and the combination is not at all unpleasing.

Goods trains present almost unlimited opportunities for "doing things differently." The standard components of the Hornby-Dublo Goods Train Sets represent the simplest possible goods train formation, but most boys commence to collect additional vehicles immediately they have purchased their first Set, so that almost any kind of representative train for miscellaneous traffic conveyed in open and covered vehicles can readily be assembled. The scope for this kind of running has been extended by the addition to the Hornby-Dublo range of the new vehicles described in the "*M.M.*" last month; these include three Tank Wagons of different designs and four Coal Wagons, each representative of one of the principal main line railways. Other splendid new goods vehicles are described on page 300 of this issue.

The inclusion of only one of each of these new items in the stock of a miniature line adds greatly to the variety of goods train working, and much more fun is possible where several of each type of vehicle are available. For instance Hornby-Dublo Tank Wagons can be run from place to place in groups, and long coal trains fully representative of the real "black diamond" traffic also can be worked. The use of Meccano Dinky Toys in connection with each of these traffics leads to most effective schemes. Thus railhead petrol and oil depots can be arranged, and the Petrol Tank Lorries, Dinky Toys No. 25d, and other components, such as the Filling Station, Dinky Toys No. 48, with its Pumps, Dinky Toys No. 49, and the Dinky Toys Garage, No. 45, can be introduced with splendid results. The illustration on the previous page shows an attractive arrangement of this kind. The working of coal wagons to local stations is a familiar feature of railway practice, and Dinky Toys lorries of various types can be used for the road cartage operations. Many other schemes of this kind will occur to the Hornby-Dublo railway owner who makes a practice of watching actual railway operations closely, and uses his imagination to reproduce similar interesting conditions on his own layout.



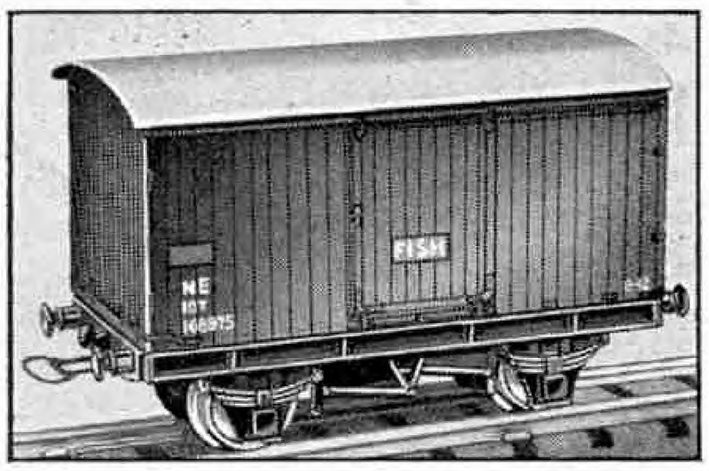
Local passenger train working with a Hornby-Dublo Tank Locomotive. The "suburban" appearance of the layout is enhanced by the country type of overbridge, which is made at home out of wood.

Variety in engine workings can be made an interesting feature of a miniature line. The Hornby-Dublo 0–6–2 Tank Locomotive can be used perfectly well for local passenger traffic, as suggested earlier in this article, and for the empty carriage work necessary on any layout. Similarly the express locomotive can be pressed into service for fast freight trains. In these days even the most important express engines are frequently used on goods trains.

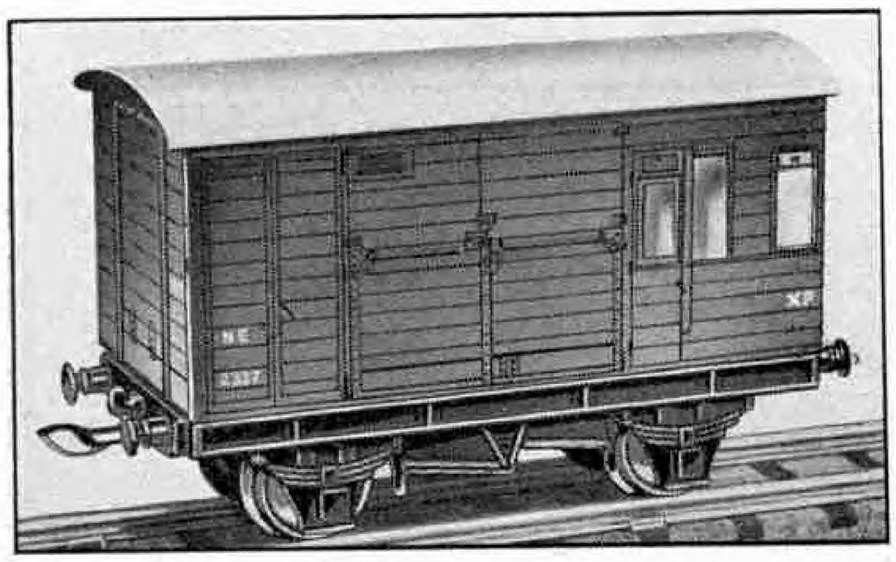
More New Hornby-Dublo Rolling Stock

Attractive Vans for Fast Freight Traffic

THE new Hornby-Dublo Petrol and Oil Tank Wagons and the realistically-loaded Coal Wagon described in last month's "*M.M.*" were only the forerunners of attractive new rolling stock that will be added to the Hornby-Dublo range this



season. They have already been followed by the splendid Horse Box, Cattle Trucks and Meat and Fish Vans illustrated on this page. The bodies of the new vehicles are built on the standard Hornby-Dublo wagon base, and are finished and detailed by the tin-printing processes used with such excellent effect for the Hornby-Dublo rolling stock previously produced. The base is manufactured by pressure die-casting so as to permit as much detail as possible to be included in its design; the bodies are equally remarkable for the amount of external detail represented, all the boarding, strapping, hinges and handles and other small parts being well shown.

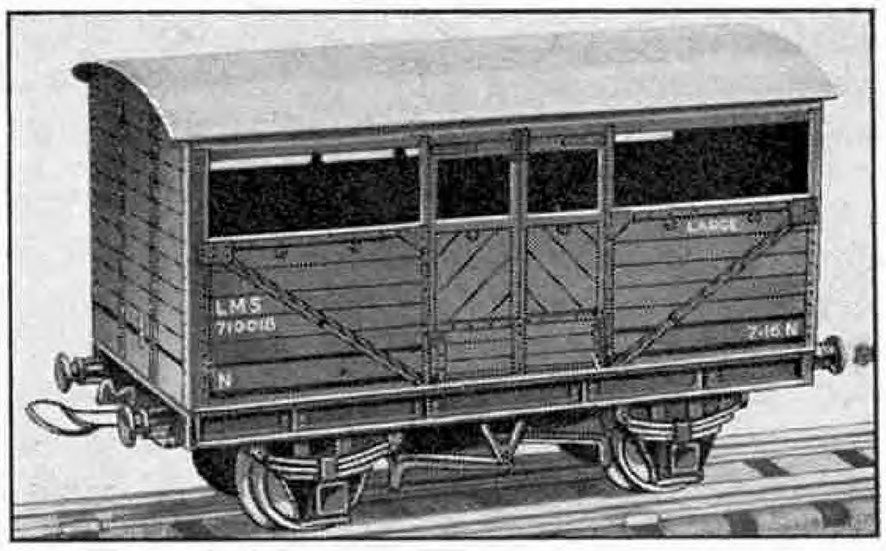


Above: The Hornby-Dublo N.E. Fish Van. The body is finished in red-brown and lettered in white.

Left: This is a model of the latest type of N.E. Horse Box, coloured in teak brown. The roof and lettering are white.

Right: An attractively designed Cattle Truck. There are two of these, coloured and lettered to represent the latest practices of the L.M.S. and G.W.R. respectively.

Below: Scale model of the ventilated meat van operated by the S.R. It is coloured buff, and the corresponding L.M.S. van is finished in Bauxite brown.



The two new Meat Vans are excellent representations of the real L.M.S. and S.R. vehicles. The L.M.S. model is finished in the now familiar Bauxite brown and has a grey roof. All the external features are faithfully reproduced, including the vertical boards, strapping and corner pieces, and the sliding doors on which the word "*Meat*" appears in white letters, and even such small details as bolt heads and invoice clips are shown. The tonnage figure, tare weight and running number also are reproduced.

The real L.M.S. meat vans, on which the design of one of the Hornby-Dublo Meat Vans has been based, are of the ventilated type for fresh meat traffic, and have ends constructed of pressed metal which is corrugated for extra strength. This feature has been indicated on the Hornby-Dublo L.M.S. Meat Van; the ends of this vehicle have not actually been pressed to shape, but the tinprint design reproduces the effect extremely well. The combination of steel ends and wooden sides for wagons and vans may seem to be a rather peculiar arrangement, but it is perfectly efficient. It has been found that the ends of wagons and vans are the parts most liable to damage, and most often in need of repair, because they are continually being knocked by loads shifting owing to shunting shocks. The metal ends help considerably in preventing this trouble.

The Hornby-Dublo S.R. Meat Van is very different in outward appearance from the L.M.S. model, although it is exactly the same size and also has metal ends, and sides representing horizontal boarding. Its sides and ends are coloured the peculiar shade of buff commonly used on S.R. vans, and it has a grey roof. The external arrangement of these vans is unusual in presenting a combination of planking and strapping in conjunction with various areas of plain sheet metal. There are the usual wide planked sliding doors placed centrally. The ends are devoid of much external detail, except for vertical strappings and cross pieces and a couple of lamp brackets. The lettering includes the words "*Meat Van*" in red letters in the centre, and there is the usual identification matter and the code word "*Mica*" and tare weight.

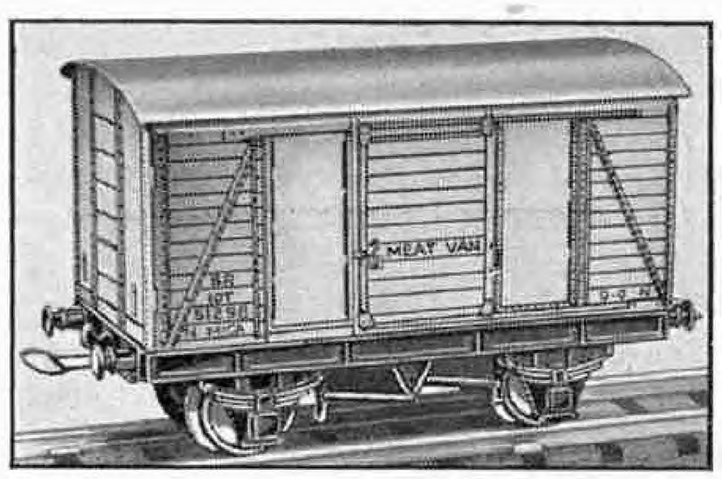
There are two Cattle Trucks, one G.W.R. and the other L.M.S. These two models are particularly interesting because their sides are pierced to represent the familiar openings of real cattle trucks. The L.M.S. model is finished in Bauxite brown and the G.W.R. in dark grey, and both are detailed correctly, including the horizontal boarding common to their prototypes. The doors are typical of the designs adopted by the respective companies. In actual practice the lower portion of these drops outward to form a loading ramp and the upper portion is double, swinging outward.

Unlike the ends of the vans previously described, those of the cattle trucks are constructed of horizontal boarding supported by vertical straps. In this respect the two models are similar, but the G.W.R. model has additional strapping. There is no identification matter on the miniatures to indicate what duties they are designed for, but this is not necessary, as their appearance is unmistakeable. They are Cattle Trucks in every detail! The G.W. model has a white roof and white lettering, and the L.M.S. Cattle Truck a grey roof and white lettering.

Another new and attractive model is the Hornby-Dublo Fish Van, which is finished in the characteristic shade of red-brown used by the L.N.E.R. for freight vehicles fitted with automatic brakes. They are constructed throughout of vertical boarding, the ends being strengthened by vertical iron work, and the name "*Fish*" appears in white in a panel on the large sliding door. Other details include the wagon's number and tare weight, and the letters "N.E." in the bottom left-hand corner. A white roof is fitted, and the general appearance of the vehicle is one of reality.

Lastly comes the Horse Box, a truly fine model! The bodywork is finished in teak brown and the lettering is in white. The detail of this Van is perfect, the attendants' portion being correctly finished with windows "that can almost be seen through," in spite of their being represented by tinprinting. The actual horse box portion has the familiar drop doors, forming an exit and entrance ramp, and upper double outward opening doors, and other details correctly shown include the horizontal end boards and steam pipes. Two lamp brackets are reproduced in the printed design. On the real vehicles these are for use when the Horse Box is being run at the rear of a passenger train.

Although the vans illustrated and described on this page are designed for fast freight work, they can be used quite correctly on express passenger trains, either at the front or the rear of the train according to traffic requirements.



Shopping By Aeroplane

How Supplies are Carried to Mining Camps in Northern Canada

By R. Merseberg

MACKENZIE, one of the North-West Territories of Canada, is a country of spruce forests, lakes and marshes. In the eight months of winter the Temperature falls to 50 deg. F. below zero, and during the four months of summer there are millions of small flies and gnats to the square yard. It seems a very uninviting area, and yet men live there, far from civilisation and away from railways and roads.

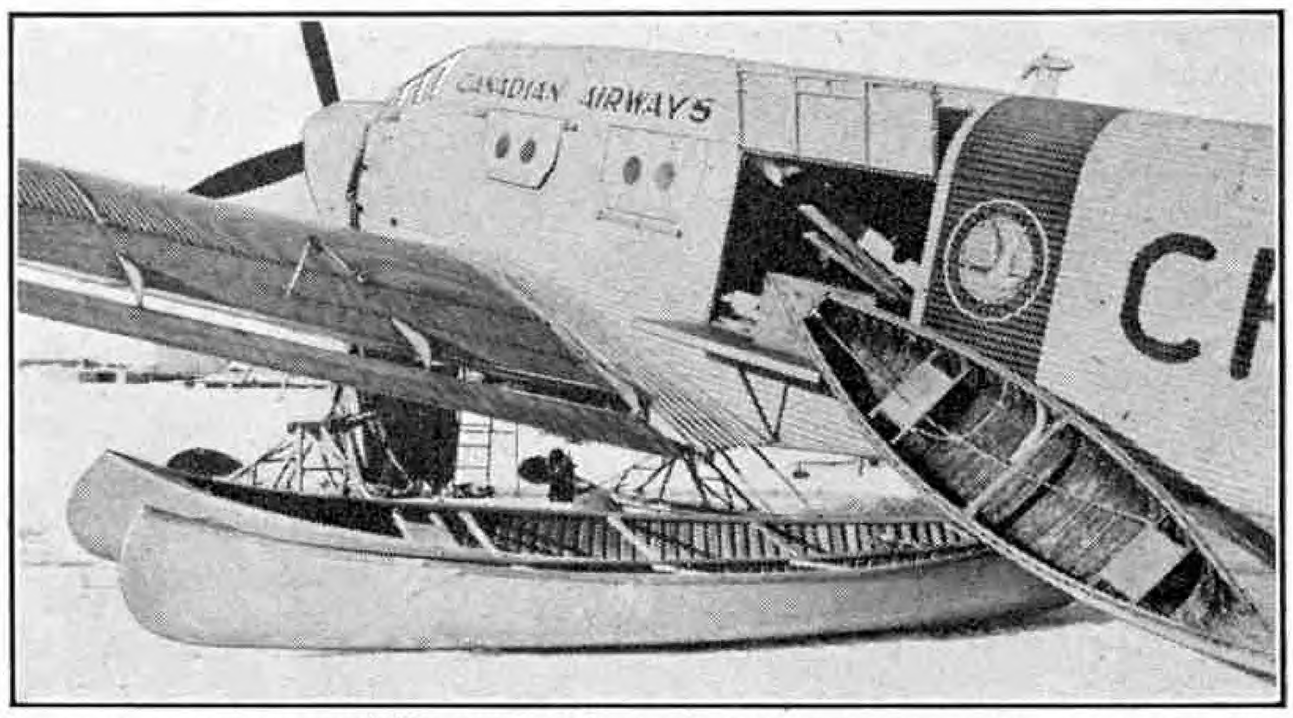
Early last year the discovery was reported of rich gold deposits near Great Slave Lake, from which the Mackenzie River flows on its way to the Arctic Ocean. On the news of the discovery a steady stream of enterprising prospectors began to penetrate into the wilderness, where they settled and searched for rich ground that would make their fortunes. The chief settlement was made on the Yellowknife River, a stream that flows from the north into Great Slave Lake, and it was called Yellowknife from the name of the stream. A mining town of simple block houses immediately sprung into existence, and it soon possessed an hotel, a firm of building constructors, a laundry, a boot-making shop and even a newspaper. This was wonderful progress indeed for a district so far in the wilds. The nearest large town is Edmonton, the capital of Alberta, which is separated from the settlement by 600 miles covered by lakes, swamps and virgin forests.



The flight engineer of the Junkers Ju 52 that maintains services between Edmonton and Yellowknife, in Canada's North-West Territories. He is interested in the dog team, the traditional means of transport there. Photographs by courtesy of Junkers Flugzeug- und -Motorenwerke, A-G., Dessau.

The inhabitants of Yellowknife and those who visit the settlement between prospecting trips are in need of goods of all kinds, and often require them very urgently. These cannot come by road or rail, and practically the only means of surface transport is by water. The rivers are frozen through the long winter, however, and then communication by this means is impossible. Yet all the needs of the new community are met. How this is done is revealed by an advertisement in "*The Prospector*," the Yellowknife newspaper, which appears on Wednesdays and Saturdays. This consists only of two foolscap sheets produced by a duplicating machine, but it sets out to bring to all within the North-West Territories "some of the daily happenings in the lives of . . . friends scattered throughout the north." Its advertisements are as interesting as its news in the evidence they give of the enterprise displayed by those who make up the settlement.

The advertisement to which attention has already been drawn informs readers that "Edmonton's Own Store" maintains an aerial shopping service, and that customers can be supplied with anything that they are unable to obtain in Yellowknife. It is inserted by Johnston Walker Ltd., a well-known Edmonton firm, and indicates how far distant parts of the world can be kept in close contact with civilisation by the use of the aeroplane. Everything that is needed can be transported there by air, so that miners and trappers are no longer isolated for long periods and there is little risk of their having to endure the privations of the northern winter that great distances formerly made almost unavoidable. In civilised countries the aeroplane offers a comfortable and speedy means of transport, but in the Canadian wilds it has become a necessity of existence.



Even canoes are taken north by aeroplane in the North-West Territories. Other unusual freights include heavy parts of mining machinery, and a narrow-gauge railway and its rolling stock.

The aeroplane that maintains regular touch with Yellowknife—"*The Flying Boxcar*," to give it the name by which it is known there—is a single-engined Junkers Ju 52 owned by Canadian Airways. This aircraft is the largest single-engined freighter in the world. The goods that it carries north include many things urgently required for practical use, among them a narrow gauge railway, canoes, ventilating ducts for mines, the frames of large Diesel engines, steel plates, petrol and oil in steel drums, and even truck loads of hay.



These pages are reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

How to Throw the Boomerang

There are two distinct types of Australian boomerang, the aboriginal weapon that is still in use in Eastern and West Australia. These are known as the "come back" and "war" boomerangs. The former is shaped somewhat like the letter "L," and is about 2 in. wide at its ends, broadening out to 3 in. at the apex. It is constructed of hard wood with flat sides, and both ends are warped, this accounting for the peculiar flight. The war boomerang is larger, measuring 36 in. across the arc, and its curvature is less than that of the "come back" type. In war this was thrown directly at an enemy, being carried forward in successive leaps.



An Australian aboriginal about to throw a boomerang. Photograph by K. N. Allen, Oatley, New South Wales.

At La Perouse, the aboriginal settlement near Sydney, boomerangs of myall, jarrah, gidyea, and light wattle can be made within three hours. I have learned to throw the boomerang there and now can do so with reasonable success, although it is an art that can be acquired only by assiduous practice. The boomerang is taken firmly in the right hand in the manner shown in the upper illustration on this page, and the arm is next brought to the front past the shoulder. Simultaneously the left foot is placed forward, and the weapon is released when it is at full arm's length. Its course flattens out horizontally, after which it rises and completes a number of circles before landing at the feet of the thrower. It is a sharp jerk of the wrist that makes the boomerang return, and skilled blacks can make the weapon come back after hitting a duck on a lake. The boomerang is exclusively Australian, although a weapon that looks very much like it, but does not return to the thrower, has been discovered in use among primitive tribes in India and Africa.

K. N. Allen (Oatley, N.S.W.).

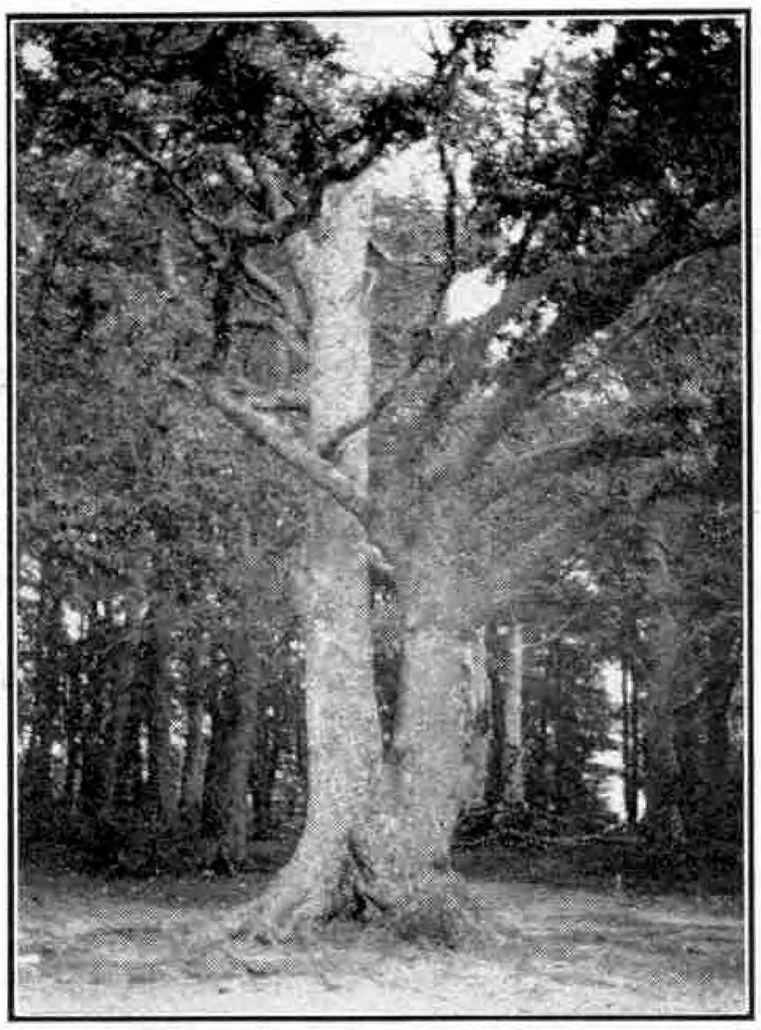
Freaks of Nature

I was interested in the photograph of curious tree formations at Rufford, Lancashire, that was reproduced in the "*M.M.*" for last November. It seems to me that the rails had been forced against these trees, perhaps by cattle, and became embedded in them, as each new annual layer of wood was added.

I often used to climb a beech tree near my home that had a "handle" about 15 ft. from the ground. Apparently a branch had grown out of the trunk and then rejoined it, forming a "handle" about 2 ft. long and 1 in. in diameter.

The photograph reminded me of another freak of nature to be seen near the Rufus Stone at Minstead, in the New Forest. This is shown in the lower illustration on this page, and consists of two trees that seem to have grown from the same roots. Yet the tree on the left is a beech, and the other an oak.

P. Lawrie (London).



A beech and an oak at Minstead, in the New Forest, apparently growing from the same roots. Photograph by P. Lawrie, London.

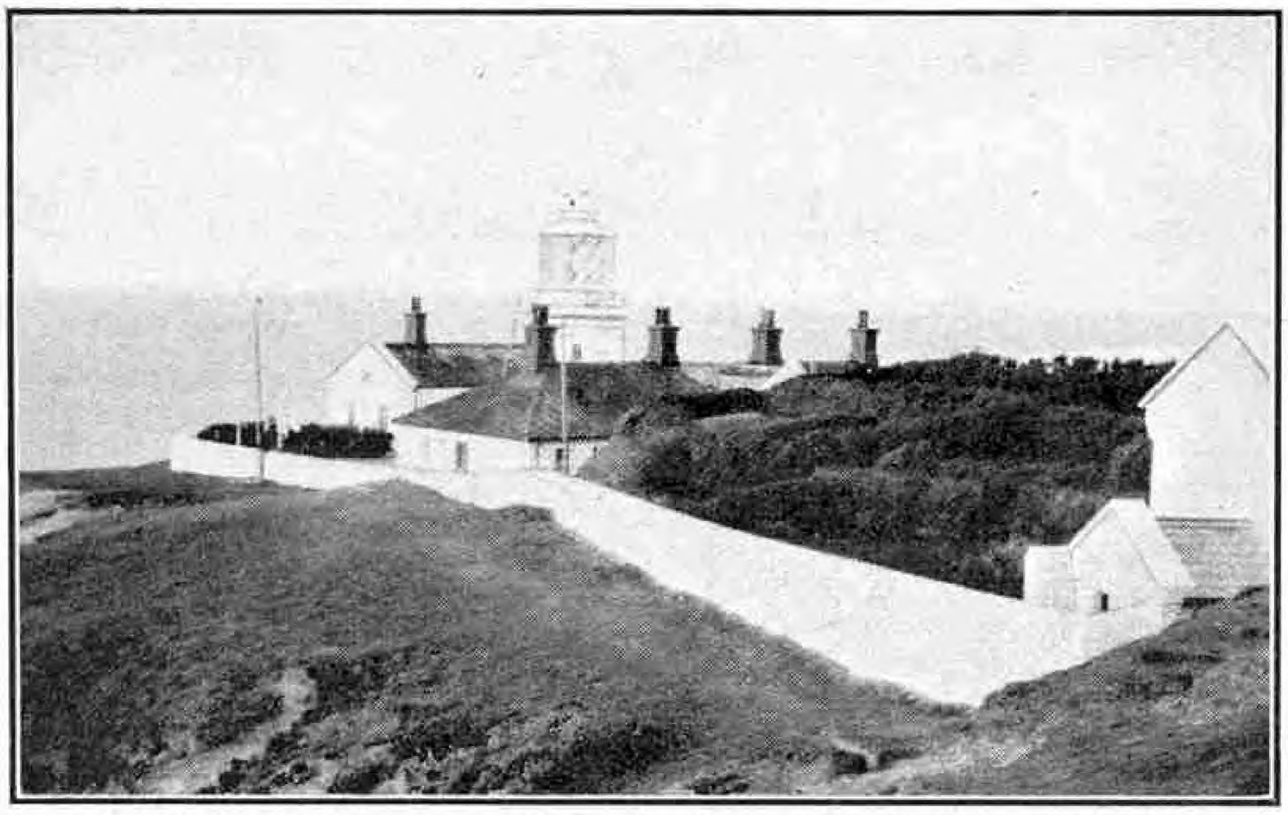
The Cape Agricultural Show

This Show is a great annual event, to which crowds of farmers and other people flock. It is held at Rosebank, a suburb of Capetown, and cattle, horses and agricultural produce from every part of the Union of South Africa are entered in the contests arranged. The visitor can spend hours watching Jersey cows, fat merino sheep and intelligent-looking farm horses standing in stalls while judges examine them, or inspecting tractors, ploughs, pumps, lathes and drills in the mechanical section. Crowds throng the oval to see the parades and jumping contests, or specially thrilling displays of some kind. At the Show I visited, a squad of motor drivers who carried out crashes for film purposes gave a startling demonstration of their skill.

J. Smith (Deep River, South Africa).

The Bull Point Lighthouse

During a holiday at Woolacombe, near Ilfracombe, Devon, I visited the Bull Point Lighthouse, which stands on the point separating Woolacombe from Morthoe. The signal is a group of three quick white flashes every half-a-minute, and is visible at a distance of 18 miles in clear weather. Light from the main lamp is also reflected to a point 18 ft. below the main light, to give a red fixed light. The apparatus of the revolving light is turned, like the wheels of a giant grandfather clock, by means of weights, which are wound up once every two hours.



The Bull Point Lighthouse, near Ilfracombe. Photograph by R. Hyder, Berkhamsted.

For use in bad weather there is a foghorn that gives a blast lasting 6 sec. once every minute, and is operated by compressed air contained in cylinders, the air being kept at the required pressure by means of oil engines. Its blast can be heard 12 miles away, and is caused by air rushing against a rotating cylinder with holes drilled in the side. The lighthouse was rebuilt 10 years ago, but the mechanism was not changed.

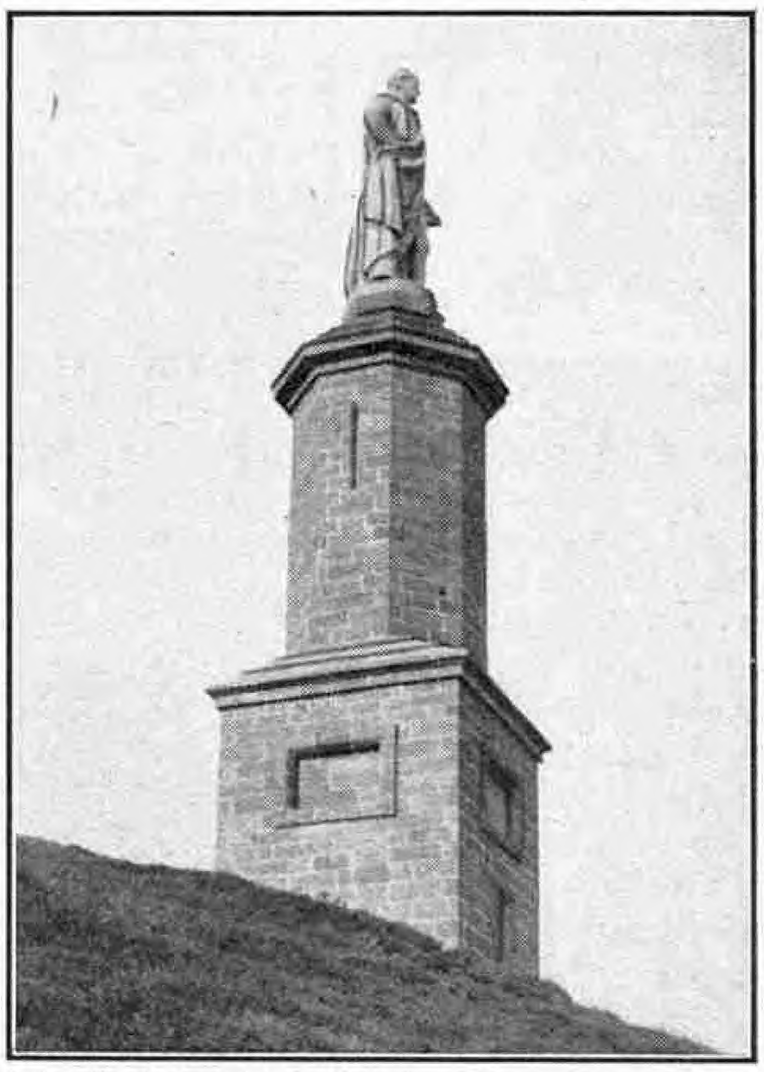
R. Hyder (Berkhamsted).

The Highest Statue in Europe

While on holiday in Scotland I visited what is said to be the highest statue in Europe. It stands at the summit of Ben Bhraggie, Sutherlandshire, and is erected to the first Duke, the 19th Earl of Sutherland. It was raised in 1834 with money subscribed by tenants who benefited by the Duke's kindness.

The statue, which is 25 ft. high, is built of white granite, and stands on two pedestals built of red granite quarried from Ben Bhraggie itself. The whole structure is 130 ft. in height, and is 1,255 ft. above sea level. The statue was taken up to the summit in parts by a road specially constructed for the purpose, and it is still possible to go up this road by car.

"The First Duke," as the statue is known as locally, is visible for many miles around, and is a useful landmark for motorists and also for the navigators of ships out at sea.



"The First Duke," a statue in Sutherlandshire that is claimed to be the highest in Europe. Photograph by R. G. Robertson, Balerno.

When the 18th Earl of Sutherland died, he was succeeded by the Countess, who married a son of the Duke of Stafford. The latter thus became the 19th Earl of Sutherland, and on 28th January 1833 he was created a Duke. A curious feature of this famous Scottish statue is that it is a memorial to an Englishman, for the first Duke was the son of the English Earl of Stafford.

R. G. Robertson (Balerno).

Climbing a Mountain by Railway

I commenced my railway journey to the Jungfraujoch summit at the little town of Interlaken, which is between the Lakes of Thun and Brienz in the Bernese Oberland of Switzerland. The first stage, to Lauterbrunnen, at a height of 2,621 ft., was covered in an electric train. An overhead pick-up system is employed over the greater part of this line, but a rack and pinion is brought into use on the steeper sections, and whenever the train entered one of these sections a series of jolts and bangs made me wonder if it had left the rails. The line passes between pleasant green slopes dotted with chalets, and it was interesting to watch the peasants gathering hay on the steep slopes. They load this on to sledges, which are lowered down the hillside by means of ropes.

At Lauterbrunnen the second stage of the journey starts, this time on the Wengenalp Railway, the line of which crosses the White Lutschine. As the train slowly climbs upward distant snowclad peaks come slowly into view. Many waterfalls are crossed and there are several tunnels. At Kleine Scheidegg, which is at a height of 6,770 ft., I had a fine view of the three highest peaks in the range, the Eiger, the Mönch and the Jungfrau, and soon after leaving this place the train entered a tunnel that extends over the rest of the journey to the summit. After a run of a quarter of an hour we reached Eigerwand, where the station is hewn out of solid rock entirely within the mountain, and there a halt was made to enable passengers to enjoy the magnificent view from a gallery looking out over Lake Thun. Eismeer was reached at an altitude of 10,368 ft., and from a gallery at this station a splendid view was obtained of the Aletsch Glacier. This is the largest in Europe, and it has been estimated that it contains 40,000 cu. yds. of ice.

From Eismeer the tunnel passes very steeply through the Mönch to the terminus at the Jungfraujoch, the highest station in Europe. Its height is 11,340 ft. above sea level, and it also is cut out in the mountain rock. I went up in a lift to the Jungfraujoch plateau, and on stepping out was confronted with a dazzling expanse of white, making the sky appear almost black in comparison. I also saw the wonderful ice palace carved out of the solid glacier. Here 50 ft. below the surface skating is possible in a hall, the walls, floor and roof of which are solid ice.

G. V. Short (Royston).

Working Models Built from Small Outfits

A Diesel Engine—Swing Boat—Derrick Crane

THE three fine working models described this month can be built with small Outfits, but at the same time provide splendid opportunities for those who have enlarged their stock of parts by adding Accessory Outfits to those with which they began the Meccano hobby. Among them are a marine Diesel engine (Fig. 2) that can be built from Outfit No. 2 and a swing boat (Fig. 1) designed for Outfit No. 3. The third is a really attractive Scotch type derrick crane for which the contents of Outfit No. 5 are required.

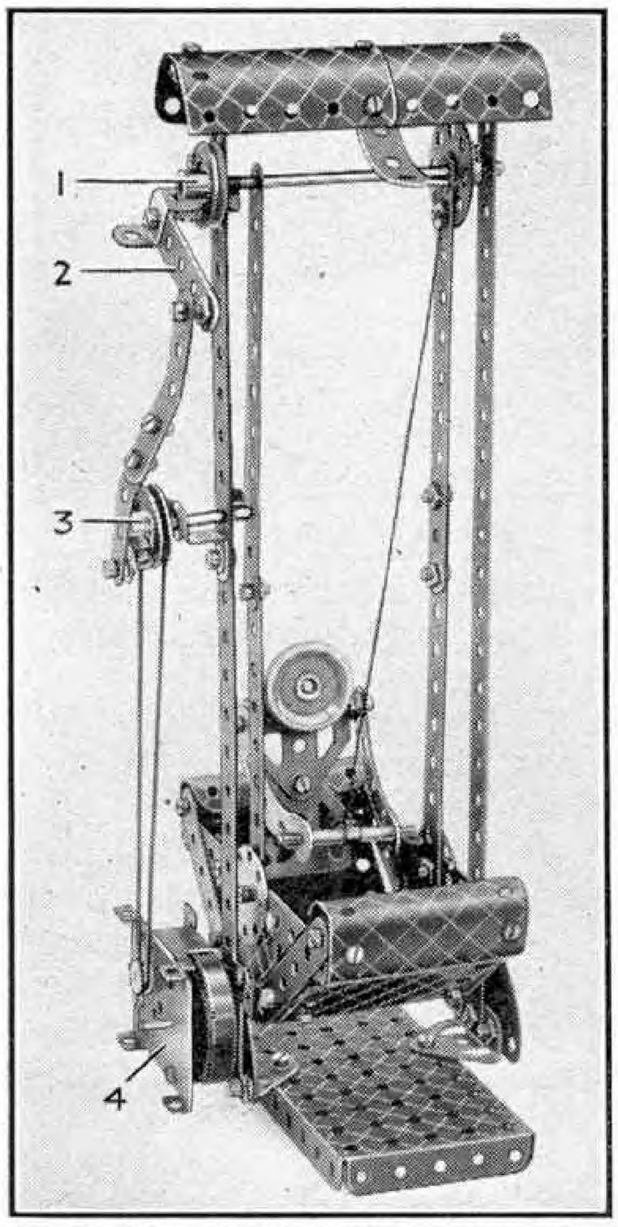


Fig. 1. This working model swing boat is a good subject for owners of Outfit No. 3.

The simplest of the three models is the single-cylinder Diesel engine shown in Fig. 2. The bed-plate of this is built first by bolting two 5″ × 1½″ and two 2½″ × 1½″ Flexible Plates to the Flanged Plate 1. The uprights are next attached, the four 5½″ Strips being bolted to the Plate 1 by their second holes and connected at their upper ends by 2½″ × ½″ Double Angle Strips. The ends of the latter are joined by a Trunnion and two Flat Brackets. On top of this structure comes the engine cylinder, made up of two 1 11/16″ radius Curved Plates and a U-Section Curved Plate bolted together and attached to the Double Angle Strips as shown. The cylinder head is a Bush Wheel attached to the Curved Plates by an Angle Bracket, and in its boss is fixed a 3½″ Rod 4.

The crankshaft webs are formed by the 1″ Pulleys 2, the bosses of which carry Angle Brackets. The Brackets are each spaced from the boss by two washers, through which passes a bolt. The Pulleys are fixed on 2″ and 3½″ Rods respectively, bearings for the Rods being provided by Flat Trunnions, and the connecting rod is pivoted on a ⅜″ Bolt lock-nutted to the Angle Brackets. This rod consists of two 2½″ Strips bolted end to end, the joint being reinforced by a further Strip. At its upper end the connecting rod carries an Angle Bracket, the slotted hole of which slides on the 2″ Rod 4.

In order to show the model working, the pulley of a *Magic* Motor is connected by a Driving Band to the 1″ Pulley 6. The Motor is attached to the rear of the model by three ⅜″ Bolts and Strip 5. Each Bolt carries a Spring Clip on its shank for spacing purposes.

Parts required to build the model Diesel engine: 4 of No. 2; 6 of No. 5; 2 of No. 10; 4 of No. 12; 2 of No. 16; 1 of No. 17; 4 of No. 22; 1 of No. 24; 4 of No. 35; 44 of No. 37a; 39 of No. 37b; 4 of No. 38; 2 of No. 48a; 1 of No. 52; 2 of No. 90a; 4 of No. 111c; 1 of No. 125; 2 of No. 126; 2 of No. 126a; 1 of No. 155a; 1 of No. 187; 2 of No. 188; 2 of No. 189; 1 of No. 199; 2 of No. 200. 1 *Magic* Motor (not included in Outfit).

The model swing boat, the second of these three working models, also is operated by a *Magic* Motor and is particularly attractive when set in motion. Its construction is commenced by bolting two Trunnions to the 5½″ × 2½″ Flanged Plate that forms the base. The uprights are 12½″ Strips, which are braced at the bottom by Semi-Circular Plates and are connected at their upper ends by two 2½″ Strips and Angle Brackets. Two 1 11/16″ radius Curved Plates complete this part of the assembly.

Each side of the swing boat consists of two 2½″ Strips connected by a 2½″ Curved Strip, the same bolts holding also a 2½″ × 1½″ Flexible Plate. A 5½″ Strip is bolted to the upper edge of the latter part. The sides of the boat are connected by two Double Angle Strips and by two 4½″ × 2½″ Flexible Plates and Angle Brackets, and the ends are formed by U-Section Curved Plates. The body of the occupant of the swing boat consists of two Flat Trunnions to which two 2½″ Curved Strips are pivoted to form his arms. The lower Flat Trunnion is attached to the swing boat by a Double Bracket. Pairs of 5½″ Strips overlapped three holes connect the boat to a 4″ Rod journalled in the uprights, and one of the Strips is bolted to a Bush Wheel fixed to the Rod. A 2″ Rod is passed through the end holes in the arms of the figure, and this is connected by Cord to a 3″ Formed Slotted Strip bolted to the Curved Plates.

The *Magic* Motor 4 that operates the model is now bolted to the left-hand Semi-Circular Plate. It drives a 1″ Pulley 3 fixed on a 1½″ Rod, bearings for the latter being provided by one of the uprights and a Reversed Angle Bracket. An Angle Bracket is fixed to the boss of this Pulley and is pivotally connected to the 2½″ Strip 2 in the manner shown. Strip 2 is bolted to a Reversed Angle Bracket, which in turn is fixed to the boss of Pulley 1. The position of the Pulley 1 should be adjusted so that when Pulley 3 rocks lever 2, the boat swings through an equal distance on each side of the uprights.

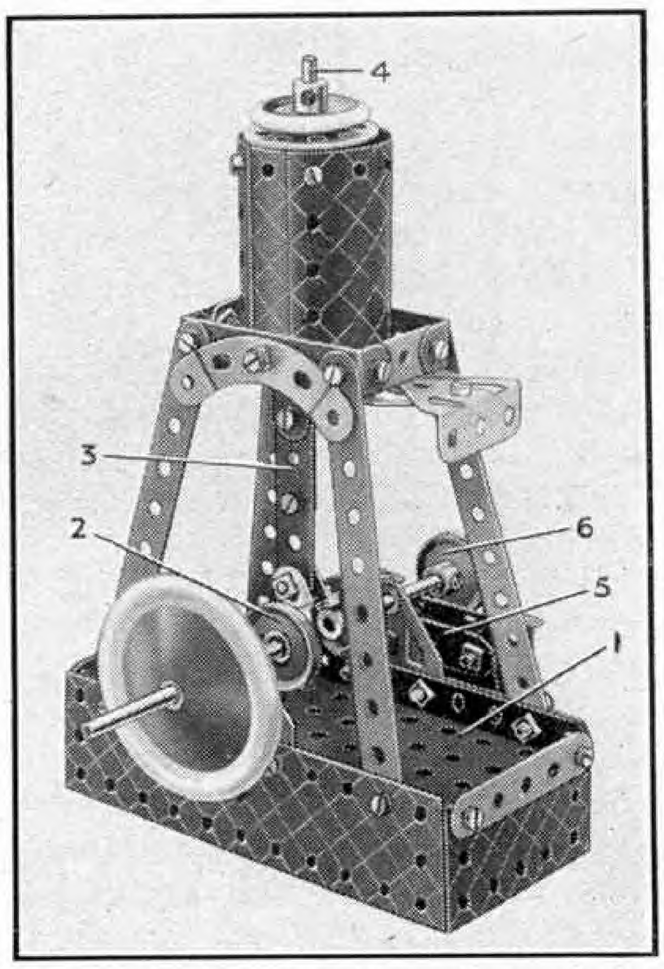


Fig. 2. A simple model marine engine operated by a Magic Motor. It can be built from Outfit No. 2.

When the Motor is set in motion the boat swings rapidly backward and forward, and a fine touch of realism is supplied by the

occupant, whose arms move up and down in a life-like manner, as if he were actually propelling the boat himself!

Parts required to build the model swing-boat: 2 of No. 1; 6 of No. 2; 9 of No. 5; 1 of No. 10; 1 of No. 11; 9 of No. 12; 1 of No. 15b; 1 of No. 16; 1 of No. 17; 1 of No. 18a; 3 of No. 22; 1 of No. 24; 5 of No. 35; 56 of No. 37a; 50 of No. 37b; 6 of No. 38; 1 of No. 40; 2 of No. 48a; 1 of No. 52; 4 of No. 90a; 6 of No. 111c; 2 of No. 125; 2 of No. 126; 2 of No. 126a; 1 of No. 155a; 1 of No. 176; 2 of No. 187; 2 of No. 191; 2 of No. 199; 2 of No. 200; 2 of No. 214; 1 of No. 215; 2 of No. 127a; 1 *Magic* Motor (not included in Outfit).

In Figs. 3 and 4 we illustrate the Scotch type derrick crane, a fine model that will provide excellent practice for the model-builder who is keen to make something really good. It is driven by an E06 or E020 Electric Motor, which operates the hoisting and luffing movements, and for actual working is best mounted on a board, which should be at least 14 in. long and 20 in. wide.

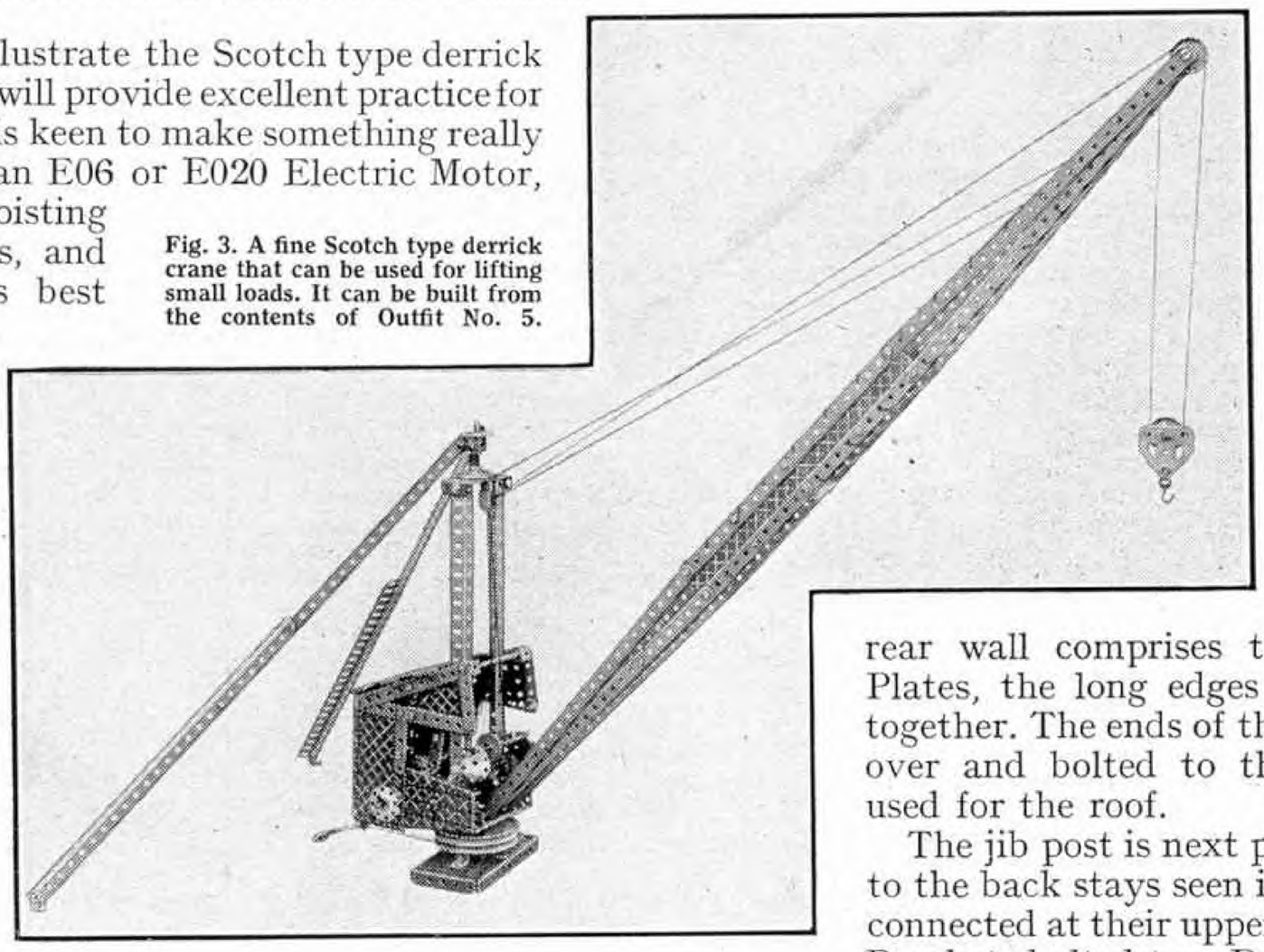


Fig. 3. A fine Scotch type derrick crane that can be used for lifting small loads. It can be built from the contents of Outfit No. 5.

Construction is best commenced with the base for the jib-post. This consists of a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate, to which a 3″ Pulley is attached by two Reversed Angle Brackets and a Double Bracket. A 2″ Rod gripped in the boss of this Pulley serves as a pivot for the jib post. The latter comprises two $12\frac{1}{2}''$ Angle Girders attached at one end to a second 3″ Pulley by $1'' \times 1''$ Angle Brackets, and at the other end to a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plate. The lower flanges of the Flanged Sector Plates 1 are connected together by $3\frac{1}{2}''$ Strips, and they are attached by Angle Brackets to the Angle Girders. To the E06 Electric Motor 2 are bolted two $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips, one of which is shown at 3, in Fig. 4, and these serve to attach the Motor, with its armature shaft in a vertical position, to the Sector Plate 1. Additional support for the Motor is supplied by connecting Double Angle Strip 3 to the jib post by means of a Trunnion.

A 1″ Pulley 4, fitted with a Rubber Ring, is fixed on the armature shaft of the Motor, and by sliding Rod 6 from side to side either of two Road Wheels, one of which is indicated at 5, can be brought into contact with it, thus providing a simple reversing mechanism. A $1\frac{1}{4}''$ Disc, which is retained on Rod 6 by washers and Spring Clips, enables Rod 6 to be moved when it is rotating. The drive is taken through a Driving Band from Rod 6 to a 1″ Pulley fixed on a Rod 7 that forms the hoisting drum.

A drive is also arranged between 1″ Pulley 10 and the Rod 6. Bearings for Rod 8, on which Pulley 10 is mounted, are provided by two $1\frac{1}{4}''$ Discs, which are bolted firmly to a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip that in turn is fixed to the jib post. Pulley 10 is free on its Rod and is fitted with two Flat Brackets as shown, the Brackets forming the jaws of a dog clutch. Rod 8 is slideable in its bearings so that the Bolts 11 in the boss of the small Motor pulley, can be engaged with the Flat Brackets. In order to prevent side movement in Pulley 10 a bolt fixed to the Double Angle Strip is arranged to engage in the groove of the Pulley.

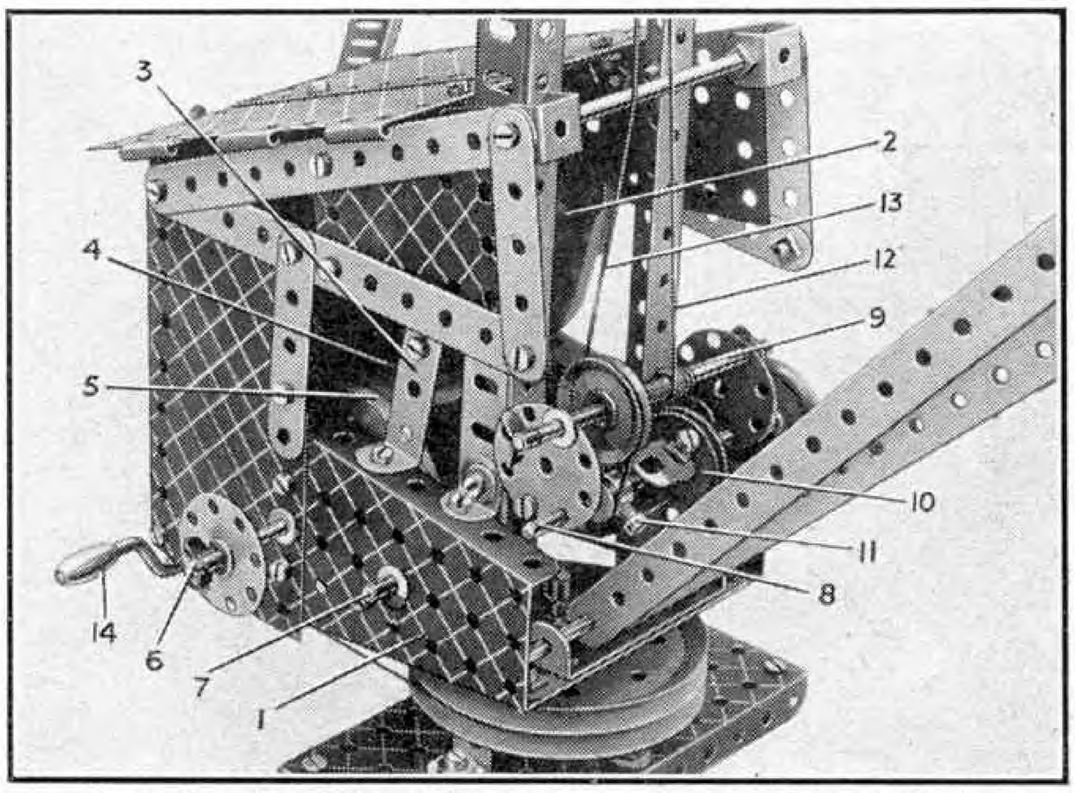


Fig. 4. The cab and mechanism of the derrick crane shown in Fig. 3.

The Motor pulley is connected by a Driving Band to a 1″ Pulley on Rod 9, which forms the drum that controls the luffing movement of the jib. As Rod 9 also slides in its bearings the two Pulleys on the Rods 8 and 9 are always in alignment.

The control cab of the crane may now be completed by the addition of the rear wall and roof. The rear wall comprises two $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates, the long edges of which are bolted together. The ends of the Plates are then bent over and bolted to the Hinged Flat Plate used for the roof.

The jib post is next pivoted to the base and to the back stays seen in Fig. 3. The stays are connected at their upper ends by Obtuse Angle Brackets bolted to a Double Bent Strip fitted with a $1\frac{1}{4}''$ Disc. A 2″ Rod, locked in the boss of a Bush Wheel bolted to the $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plate, is passed through the $1\frac{1}{4}''$ Disc and Double Bent Strip.

The construction of the jib is quite easy to follow from Fig. 3. The sides of the centre section are built up from $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates strengthened along their long edges by $5\frac{1}{2}''$ Strips. The side members so formed are connected by a $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip and $1\frac{1}{2}''$ Strips and Angle Brackets. The tapered ends of the jib are formed by $12\frac{1}{2}''$ Strips, which at the upper end are joined together by a Pivot Bolt, on the shank of which a 1″ loose Pulley rotates. The entire jib is pivoted on a $3\frac{1}{2}''$ Rod, at its lower end, as shown in Fig. 4.

The luffing Cord 12 is first wound around Rod 9 and then taken up and around a Threaded Pin fixed in a Cranked Bent Strip in the jib post. It is then led around a $\frac{1}{2}''$ loose Pulley in the jib and is tied to the top of the jib post. The hoisting cord 13 is wound around Rod 7, then over the Threaded Pin and the Pulley at the jib-head. From there it passes through the pulley block and finally is tied to the jib.

The Crank Handle 14 controls the swivelling movement of the jib and is journalled in a Double Angle Strip.

Parts required to build the model derrick crane: 10 of No. 1; 12 of No. 2; 2 of No. 3; 5 of No. 5; 2 of No. 6a; 4 of No. 8; 4 of No. 10; 3 of No. 11; 10 of No. 12; 2 of No. 12a; 2 of No. 12c; 1 of No. 15; 1 of No. 15a; 1 of No. 15b; 2 of No. 16; 2 of No. 17; 1 of No. 18a; 2 of No. 19b; 1 of No. 19g; 5 of No. 22; 2 of No. 22a; 1 of No. 23; 1 of No. 24; 14 of No. 35; 85 of No. 37; 6 of No. 37a; 14 of No. 38; 1 of No. 40; 1 of No. 44; 1 of No. 45; 1 of No. 48; 6 of No. 48a; 1 of No. 51; 1 of No. 52; 2 of No. 54a; 1 of No. 57c; 1 of No. 80c; 2 of No. 111a; 3 of No. 111c; 1 of No. 115; 4 of No. 125; 1 of No. 126; 2 of No. 126a; 1 of No. 147b; 2 of No. 155a; 1 of No. 176; 2 of No. 186a; 1 of No. 186b; 2 of No. 187; 2 of No. 188; 4 of No. 189; 2 of No. 191; 2 of No. 192; 1 of No. 198; 4 of No. 217a; 1 E06 or E020 Electric Motor (not included in Outfit).

Meccano Suggestions Section

By "Spanner"

(436) Electric Motor (B. Ware, Caterham)

In "*Suggestions Section*" of the "*M.M.*" for October 1937 appeared a novel type of electric motor built up from Elektron and Meccano parts. In Fig. 436 we illustrate another of these interesting models making use of Elektron parts. This motor is designed for operation from a 20-volt Transformer and embodies several ingenious features in its construction. It is assembled on a base consisting of a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate, to the end flanges of which are bolted two $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flat Plates.

The field coils of the motor are four Elektron Magnet Coils 1, the Cores of which are bolted in the slotted holes of a Face Plate 2, but are spaced from the Plate by two washers. The four Magnet Coils should be wired together before fitting them on the Cores, as this will be difficult if left until later. The wiring is carried out as follows. The inner terminal of one Coil is connected to the inner terminal of the next Coil. The outer terminal of the latter is connected to a similar terminal on the following Coil, the inner terminal of which is connected to the inner terminal of the third Coil. Finally the outer terminals of the third and fourth Coils are wired together, and long leads are taken from the remaining terminals on the first and last Coils.

The armature is similar to the field unit and also comprises four Magnet Coils 3 fixed to a Face Plate 4. These Coils are wired in exactly the same manner as those of the field unit.

The brushes 5 and 6 may now be fixed to the Face Plate 4. Each of them consist of a Pendulum Connection attached by an insulated 6 B.A. Bolt to an Angle Bracket, which in turn is bolted to the Face Plate 4. The Brackets are fixed in the holes on each side of one of the Magnet Coils. The two wires from the Coils should be connected to the brushes. The latter are counterbalanced by bolts and washers fixed diametrically opposite on the Face Plate. The armature shaft is a $6\frac{1}{2}''$ Rod 9.

The next step is to build the frame that carries the armature and field Coils. Four $5\frac{1}{2}''$ Strips 7 are attached by Angle Brackets to the Face Plate 2, in the manner shown in Fig. 436. The four ends of the Strips are then bent together to form a cone and bolted to a Bush Wheel 8. Two of the $5\frac{1}{2}''$ Strips 7 are fixed to the Bush Wheel 8 by 1" Screwed Rods.

The commutator is formed by a Bush Wheel 10 to which four $\frac{1}{2}''$ 6 B.A. Bolts 11 and 12 are fixed, Insulating Bushes and Washers being used to insulate the Bolts from the Bush Wheel. The two Bolts 11 are electrically connected by wire, as also are the two Bolts 12. The commutator 10 is fixed to Bush Wheel 8 by the 1" Screwed Rods previously mentioned.

The electrical circuit is wired as follows. One of the wires from the field coil is taken to an insulated Terminal on the Face Plate 2, and the other wire is connected to one of the Bolts 11 on the Bush Wheel 10. A wire is then connected to one of the Bolts 12 and is taken to a second insulated terminal on Face Plate 2. The brushes 5 and 6 should now be adjusted so that they make contact with the 6 B.A. Bolts of the commutator when the Magnet Cores of the armature are half way between the Magnet Cores of the field coil unit. The brushes should break contact when the two sets of Cores are nearly opposite each other.

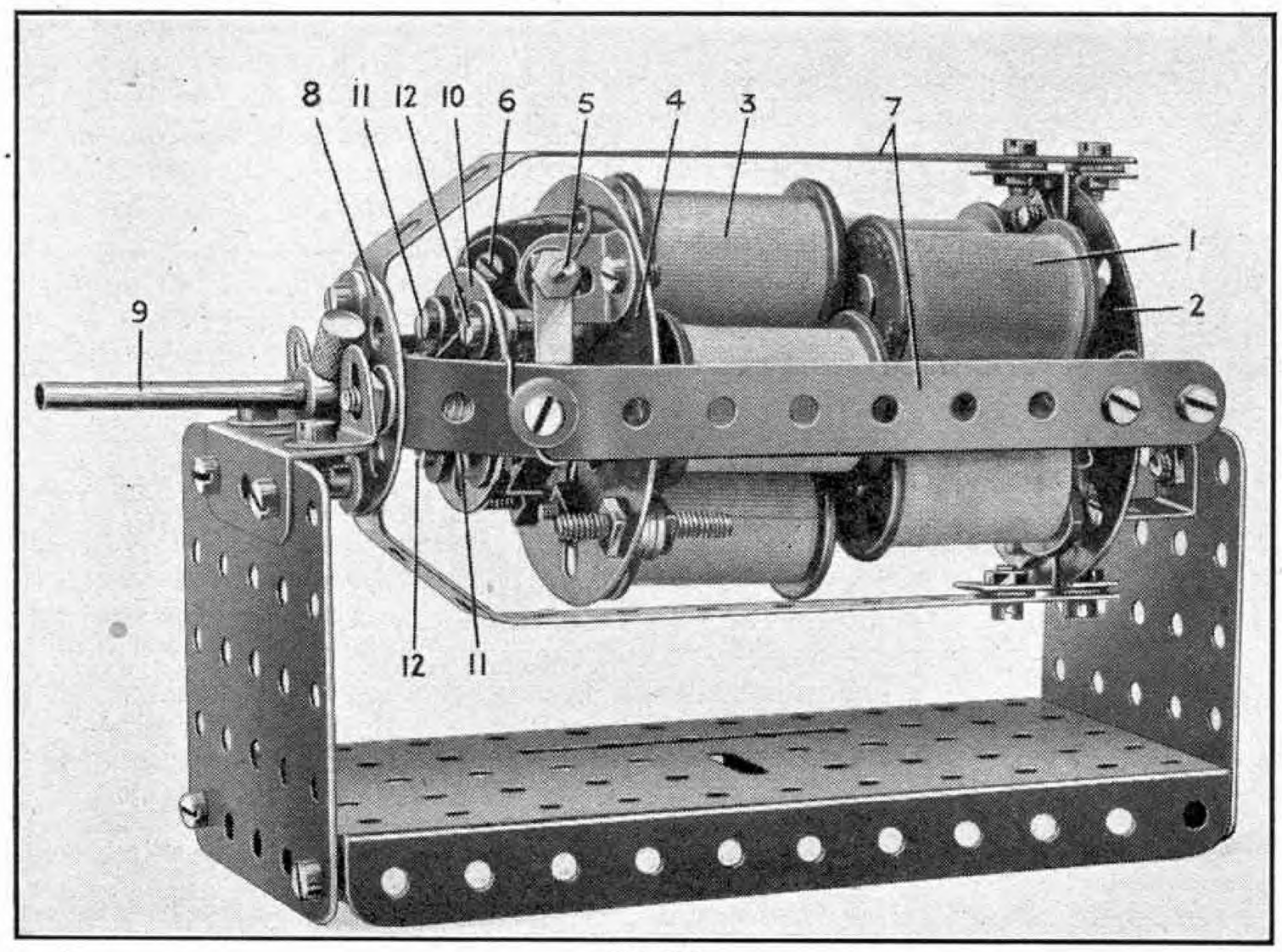


Fig. 436

(437) Aeroplane Control Gear

Meccano users who build model aeroplanes can increase the interest of their models considerably by fitting them with control mechanisms for operating the elevator, rudder and ailerons. Suitable gear for the purpose that can be fitted into

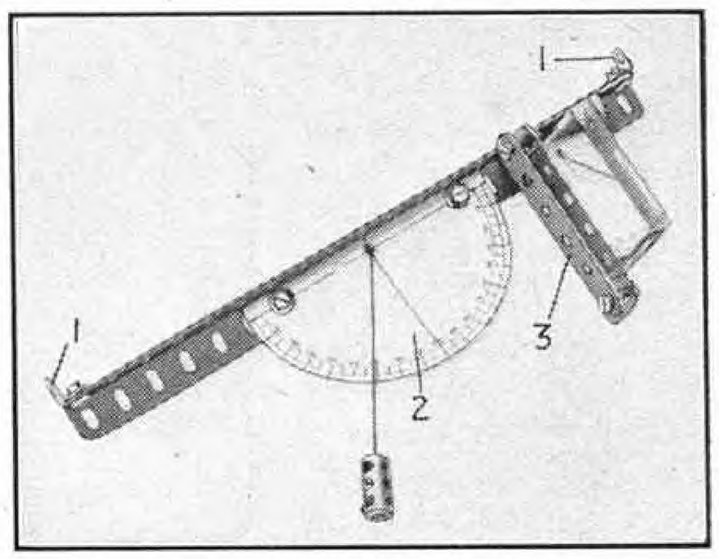


Fig. 438

almost any model aeroplane is shown in Fig. 437. The joystick 59 is a $1\frac{1}{2}''$ Rod held in the boss of a Swivel Bearing. The "spider" of the latter is secured to a 3" Rod 60, which is journalled horizontally in a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip and carries a Coupling 62. A $\frac{1}{2}''$ loose Pulley 61 turns on a $\frac{3}{4}''$ Bolt secured to the Flat Plate by two nuts, and is retained in position by means of a Collar. The rudder bar 63 consists of a $2\frac{1}{2}''$ Strip pivoted at its centre to the Flat Plate.

The wire 57 is fastened at one end to a short lever secured at right angles to the under surface of the elevator; it is then attached to the joy-stick 59, led around the Pulley 61, and taken back to another short lever secured to the upper side of the elevator. When the stick is pushed forward the elevator drops and sends the nose of the aeroplane downward. When the stick is pulled back the elevator is raised and the nose of the aeroplane also rises. The wire 70 is secured at its centre to the Coupling 62 and its ends, after being led round guide pulleys, are fastened to short levers projecting at right angles from the upper surface of the ailerons.

The ailerons are connected by another wire attached to further levers projecting from their lower surfaces. The aileron on the right side is pulled down, thus causing the wing on that side to rise when the stick is moved to the left. Simultaneously the aileron on the left side is pulled up, assisting the downward motion of the left wing, and the machine banks. When the lever is pushed to the right, the reverse movements take place.

The ends of the rudder bar 63 are connected by wires 55 to levers projecting on opposite sides of the rudder, which can be moved right or left by pushing the rudder bar with either the right or left foot.

The complete unit can easily be bolted in the cockpit by passing bolts through Angle Brackets 64 and similar parts bolted to the rear of the Flat Plate.

(438) Clinometer

(P. K. Choksi, Karachi, India)

Details of many scientific instruments reproduced in Meccano parts have been published in the "*M.M.*" from time to time, and another of these useful models is shown in Fig. 438. It is a clinometer, an instrument used for measuring angles when finding the heights of objects such as mountain tops or trees.

The instrument consists essentially of a 9½" Angle Girder, at the ends of which are fixed Angle Brackets 1 to form the sights. A Theodolite Protractor 2 (Part No. 135) is cut out and bolted to the Angle Girder as shown, and a hole is punched in it at the centre of the semi-circle. A length of Cord or thread passed through this hole carries a bob formed by a Coupling.

A small piece of mirror glass is clamped by ½" Bolts between a Strip 3 and a Flat Girder. The latter is attached by Hinges to a Flanged Bracket bolted to the Angle Girder.

The instrument is quite easy to use. For example, suppose it is desired to find the height of a tree. The tree is "sighted" by looking through the Angle Brackets 1 and the mirror is then swung into position so that it reflects the angle indicated by the plumb line on the Theodolite Protractor. The mirror enables this reading to be taken without removing the eye from the sights. The angle indicated is the angle of elevation of the top of the object. If two such angles are measured at points along a straight line passing through the base of the object, and at a known distance apart, the height of the object can be calculated or measured on a scale drawing.

(439) Servo Friction Clutch

(K. Wallace, Motherwell)

In Fig. 439 is illustrated a servo friction clutch that makes use of the turning power of the driving motor for its application. One of its special features is that it takes up the drive smoothly, and it can be used to advantage therefore in models such as cranes. The construction of the clutch is made clear in Fig. 439, which shows the mechanism as it would be fitted in a model crane.

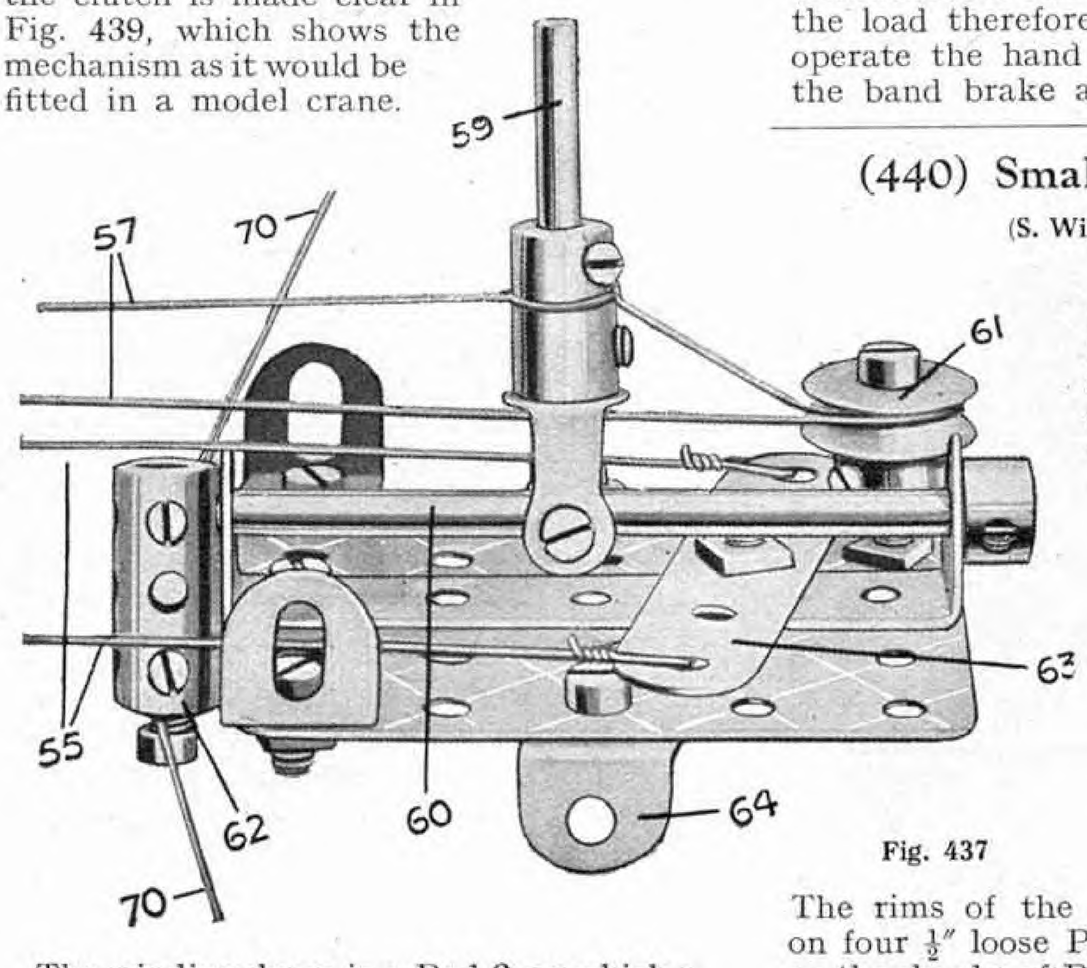


Fig. 437

The winding drum is a Rod 2 on which a 3" Pulley is free to rotate. This Pulley is driven from Rod 1, and carries a 1" Rod on which a Collar 4 and a 50-teeth Gear are fixed. The Collar is fitted with a bolt to which a length of Cord is tied. The latter passes around the rim of a 1½" Pulley 3

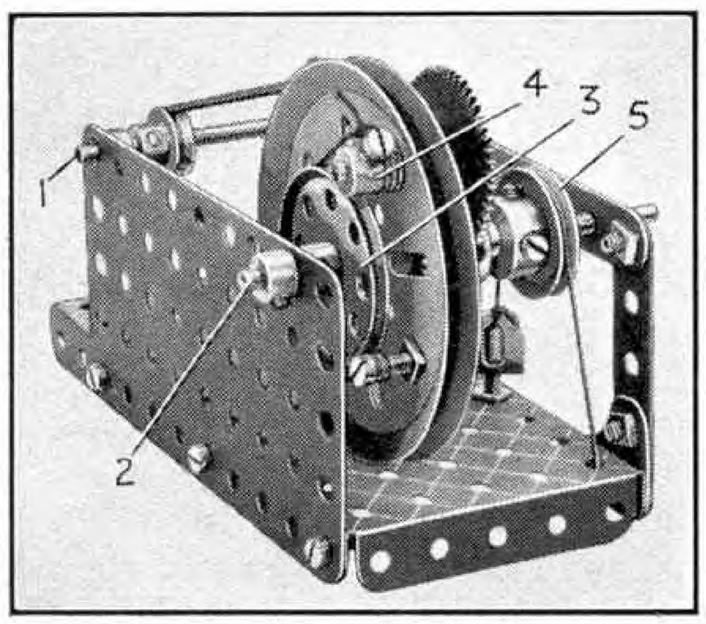


Fig. 439

fixed to Rod 2, and is tied to a ½" Bolt lock-nutted to the 3" Pulley.

The 50-teeth Gear meshes with a ¾" Pinion, which is connected to a 1" Pulley 5 by a Socket Coupling. This assembly is free to rotate on Rod 2, but its rotation can be retarded by a band brake made by anchoring a length of Cord to the baseplate, passing it around the 1" Pulley, and tying it to an Angle Bracket. The Bracket can be moved up and down the shank of a ¾" Bolt by means of a Threaded Boss. When the band brake on Pulley 5 is slack, the 3" Pulley and Pulley 5 rotate as one unit and no drive is transmitted to Rod 2. If the rotation of Pulley 5 is retarded, however, the 50-teeth Gear rotates around the ¾" Pinion and tightens the band brake around the 1½" Pulley. As this is fixed to Rod 2, it transmits the rotation of the 3" Pulley to this Rod.

When incorporated in a model the band brake around Pulley 5 can be operated by a suitable hand or foot lever.

The outstanding feature of this clutch is that when fitted to a model crane it facilitates the lowering of loads under gravity. When the power unit is stopped the load remains still, but as soon as the friction brake is released on Pulley 5, the band brake on the 1½" Pulley 3 is released and the load commences to fall. To control the descent of the load therefore it is only necessary to operate the hand or foot lever actuating the band brake around Pulley 5.

(440) Small Pivot Bearing

(S. Williams, Cardiff)

It is often necessary to provide some form of pivot bearing in models, such as a roundabout, where a rotating structure is supported from the top of a central column. The bearing shown in Fig. 440 is ideal for use in models of this kind. It consists essentially of two 1⅛" Flanged Wheels, the lower one bolted to the vertical pillar and the upper one to the superstructure of the model. The rims of the Flanged Wheels rotate on four ½" loose Pulleys, which are carried on the shanks of Pivot Bolts. The latter are screwed into the tapped holes of a "spider" taken from a Swivel Bearing and are held in place by lock-nuts. The drive to the superstructure can be taken from the Rod that passes through the boss of the lower Flanged Wheel.

(441) Simple Expanding Brake

(N. Ferry, Timperley)

Recently I received details of a new internal expanding brake for model motor cars made by N. Ferry, Timperley. The main features of the device are simplicity and neatness, and a description of it will be of interest to other model-builders.

The brake mechanism is built up on a Face Plate and the brake drum may be either a Boiler End or a Wheel Flange. The friction shoes are Obtuse Angle Brackets, each of which is bolted to the short arm of a 1" × ½" Angle Bracket pivoted by its slotted hole to a Face Plate. The pivot bolts pass through adjacent holes in the inner circle of holes in the Face Plate, and the Angle Brackets are connected together by a short length of Spring Cord, which keeps them in contact with the boss of the Face Plate.

The brake shoes are expanded by a 1" Corner Bracket, which is fixed on a lock-nutted bolt that is free to slide in the slotted hole of the Face Plate between the two shoes. When the complete assembly is fitted in a chassis, the bolt carrying the Corner Bracket is connected to the brake pedal by wire or Strips. When the pedal is pressed down the bolt is pulled along the slotted hole of the Face Plate, and as a result the Corner Bracket forces the shoes into contact with the brake drum.

It will be gathered from this description the device requires only a few parts for its construction and consequently will be of use to model-builders whose stock of parts is rather limited.

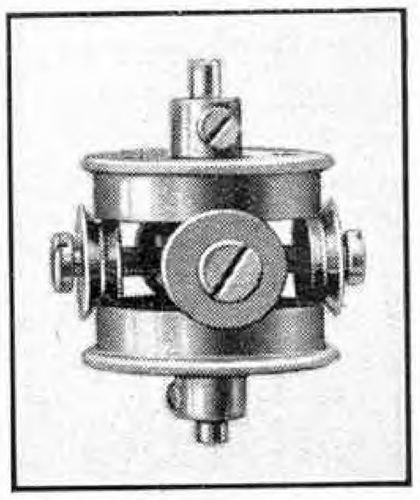


Fig. 440

Miscellaneous Suggestions

Under this heading "Spanner" replies to readers who submit interesting suggestions regarding new Meccano models or movements that he is unable to deal with more fully elsewhere. On occasion he offers comments and technical criticisms that, he trusts, will be accepted in the same spirit of mutual help in which they are advanced.

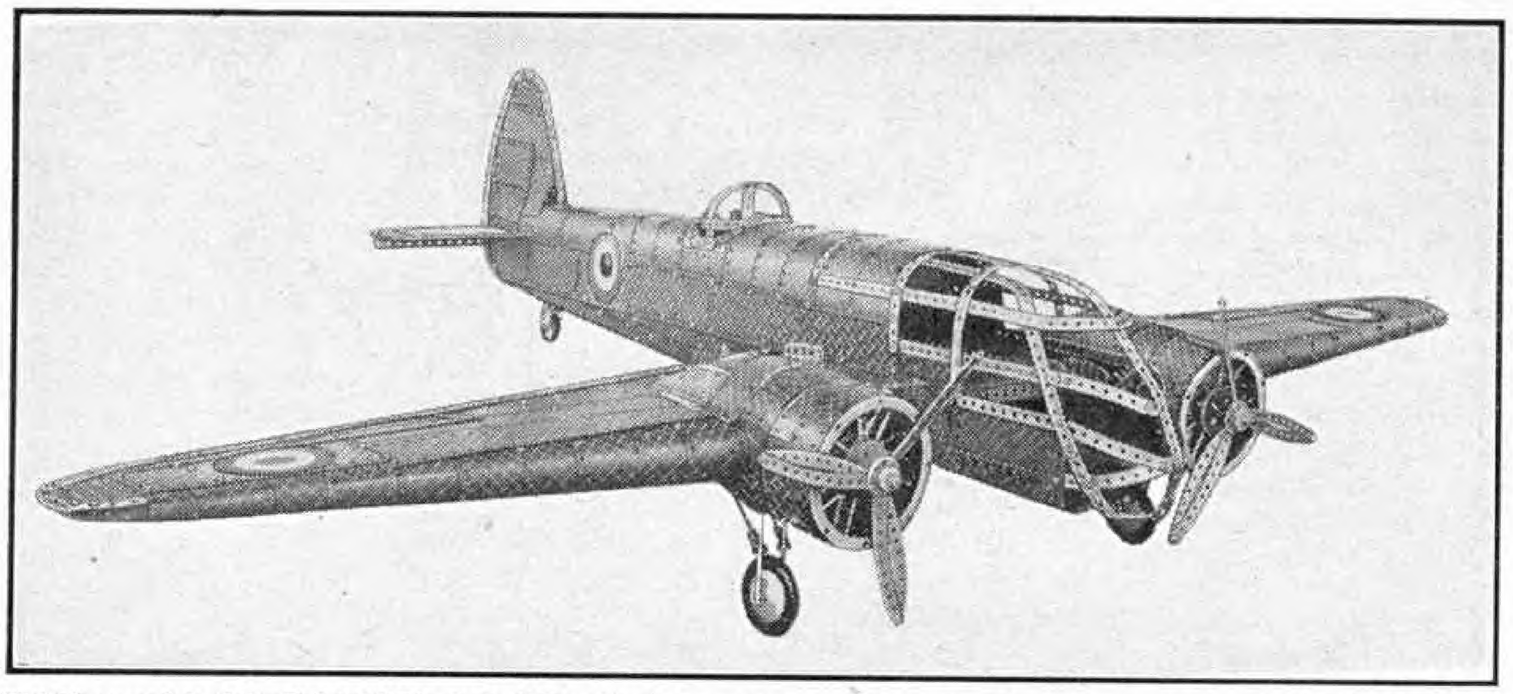
M213. It sometimes happens that a model-builder finds himself short of a 3½" Gear Wheel, and it is then necessary to bolt the Gear Ring (Part No. 180) to a Face Plate in order to fix the Ring to a Rod. This must be done accurately, however, as the boss of the Face Plate must be at the exact centre of the Gear Ring, otherwise the built-up gear wheel will not run truly and will cause trouble when meshed with a Pinion. A. Reeves, Woking, points out that a 2½" Gear Wheel can be pressed into the centre of a Gear Ring and makes a firm built-up 3½" gear that is not in the slightest degree eccentric. The fact that the 2½" Gear can be fitted into the Gear Ring demonstrates the accuracy with which Meccano Gears are cut and is a further example of the adaptability of Meccano parts.

M214. Several model-builders have suggested that the hooks fitted to the Meccano Pulley Blocks should be supplied as separate parts, with threaded shanks to allow them to be fitted to built-up pulley blocks. We should like to hear the opinions of other model-builders on this proposal.

Aeroplane Construction in Meccano

A Fine Model of the Bristol "Blenheim" Bomber

MOST Meccano model-builders are interested in aircraft, and the rapid developments that are taking place in the design of machines and their equipment provide even the most enthusiastic model-builders with plenty of material to keep them fully occupied. Many good models of this kind have been illustrated in the *"M.M."* from time to time, and a further example is the fine reproduction of a Bristol "Blenheim" Bomber illustrated on this page. The model was constructed in the Meccano model-building department and possesses most of the outstanding external features of the actual machine, which is a twin-engined medium bomber and one of the fastest of its type in the world. The model has a wing-span of 5 ft. 8 in. and an overall length of just over 4 ft., and a point of particular interest is that it is built almost entirely from Strip Plates and Flexible Plates.



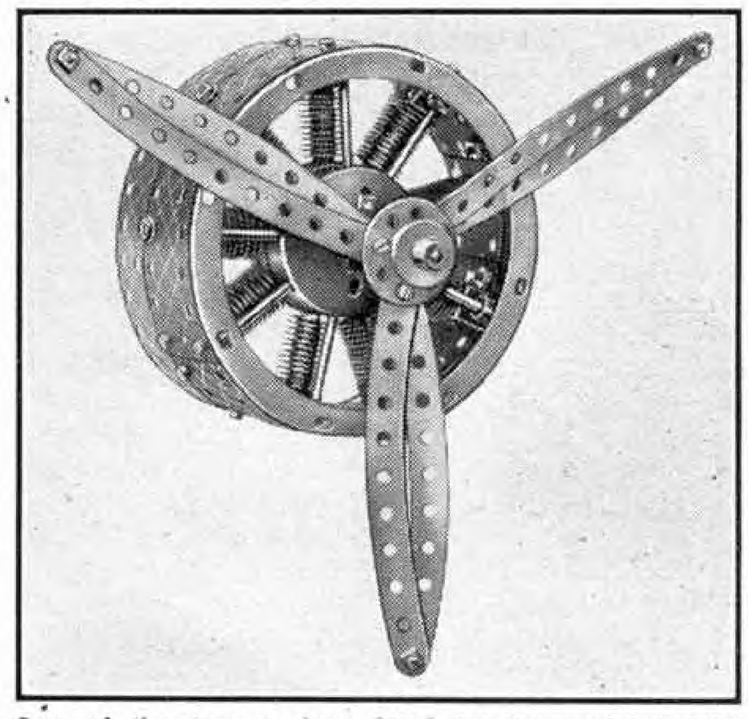
This fine model of the Bristol "Blenheim" Bomber has a wing span of nearly 6 ft., and was constructed in the Meccano model-building department at Liverpool.

The wings are modelled to the same shape as those of the actual machine and consist mainly of Strip Plates, the leading edges being formed by Flexible Plates. In order to give the wings and tail unit a clean outline, the edges of the Plates are clamped between Strips. Curved Strips of suitable radius are used to form the wing tips and fin. The wings are quite rigid, a feature that was obtained by the use of two built-up spars in each of them. The spars pass right through the fuselage so that actually the wings form one long cantilever structure.

There is no difficulty in building up wings of this kind provided that the job is tackled in the proper manner. In building the model illustrated the leading edge of each wing was first assembled on the front spar, which consists of 24½" Angle Girders and tapers from 2½" to ½" in depth. The rear spar comprises two 18½" Angle Girders, which are spaced 2 in. apart at the fuselage end and bolted together at the wing tip. The bolt holding the Girders together at the tip was not inserted until the plates forming the upper and lower wing surfaces had been bolted to the spars. It was then an easy matter to bring the plates together at the trailing edge and to clamp them between Strips.

The fuselage also is strongly constructed and consists essentially of a framework of Angle Girders, to which Strip and Flexible Plates are bolted. The fin is an essential part of the fuselage. As will be seen in the upper illustration, the Plates of which it is constructed are bolted to the fuselage and are tapered into the framework of Strips that form its outline.

The engines are close reproductions of the Bristol "Mercury" engines fitted to the actual machine and are interesting from a constructional point of view as they include several novel features in their make-up. The crankcase of each engine is formed by two Wheel Flanges and a Boiler End, the Wheel Flanges being held together by two 1" Screwed Rods so that their rims grip nine 2" Screwed Rods. The latter are spaced evenly around the rims of the Wheel Flanges and each is fitted with two nuts and a washer. When the nuts are tightened up they grip the rims of the Wheel Flanges. Each Screwed Rod carries 13 ¾" Discs spaced apart by 12 Washers. The Discs form excellent representations of the cooling fins of the actual engine. Each of the cylinder heads is formed by a Double Bracket and an Angle Bracket.



One of the two engines fitted to the model Bristol "Blenheim" Bomber.

The push rods that actuate the inlet and exhaust valves of each cylinder of the actual engine are enclosed in a single sleeve, and in the model this is represented by a 1½" Rod gripped in a Collar. The reduction gear housing is a Chimney Adaptor held on the Rod that forms the airscrew shaft.

The complete engine fits snugly into a cowling formed by bolting 5½" × 1½" and 2½" × 1½" Flexible Plates around a Circular Girder. At the rear of the cowling is a Hub Disc, which is attached to a 3" Pulley by Double Angle Strips, the Pulley being bolted to the front spar of the wing.

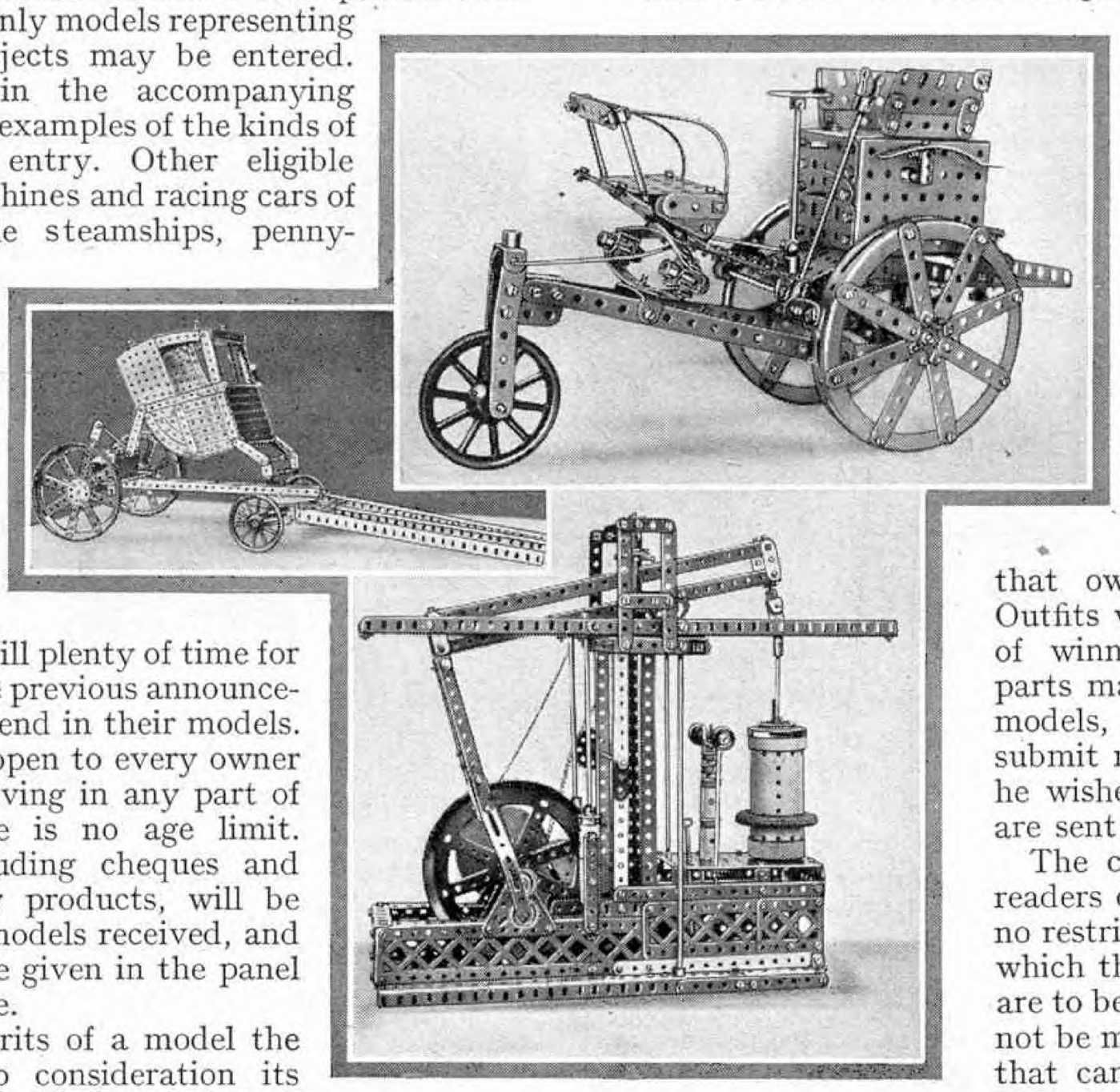
Another point of interest is the formation of the engine nacelles. These are built around Circular Girders bolted to the front spars of the wings. The front of the nacelle is made entirely from 2½" × 1½" Flexible Plates bolted side by side around the Circular Girder, the corners of the Plates being bolted together at their free ends. The rear of the nacelle is streamlined into the wing.

Splendid Prizes for Readers' Models

Contests for Owners of Outfits of all Sizes

"Engineering of the Past" Competition

Last month we announced details of an important new competition in which only models representing early engineering subjects may be entered. The models shown in the accompanying illustration are typical examples of the kinds of models suitable for entry. Other eligible subjects are flying machines and racing cars of 20 years ago, paddle steamships, penny-farthing bicycles, early lathes or other machine tools, and in fact any engineering structure or appliance that nowadays is considered old fashioned and out of date. The competition will remain open until 31st July, so that there is still plenty of time for readers who missed the previous announcement to prepare and send in their models.



Typical models of time-honoured engineering relics suitable for entry in the "Engineering of the Past" Competition announced on this page. At the top is a representation of a Benz motor car of 1898. A model of a post-chaise is shown in the centre, with one of a beam engine below it.

The competition is open to every owner of a Meccano Outfit living in any part of the world, and there is no age limit. Valuable prizes, including cheques and Meccano and Hornby products, will be awarded for the best models received, and full details of these are given in the panel at the foot of this page.

In assessing the merits of a model the judges will take into consideration its builder's age, and they will look particularly for such features as novelty of subject, good mechanical construction and ingenious applications of the Meccano parts used. Neat workmanship also is important.

It is not necessary to send actual models. A clear photograph, or if this is not possible, a good drawing is all that is required. If a model possesses unusual features not easily apparent from the photograph or drawing, a brief explanation may be desirable, and this should be written on a separate sheet of paper and sent along with the illustrations. Any model entered must be the competitor's own work, both in design and construction, but illustrations need not be his own work.

Entries for both Home and Overseas readers will be grouped into one Section and may be sent in any time up to 31st July. Any entries received after that date will be disqualified. Entries should be addressed "*Engineering of the Past Contest,*" Meccano Ltd., Binns Road, Liverpool 13.

"Humorous Horse and Jockey" Contest

This Contest has been designed to give readers an opportunity of enjoying real fun with their Outfits, with the prospect of gaining a valuable prize for their efforts. In it they are asked to build models of a horse and jockey, and to arrange these in as amusing a manner as possible. If they wish competitors may build their models in the flat, like a drawing or cartoon, so that owners of the smallest Outfits will have every chance of winning. Any number of parts may be used in building models, and a competitor may submit more than one entry if he wishes, provided that they are sent in the same envelope.

The competition is open to readers of all ages and there is no restriction on the manner in which the horse and its jockey are to be arranged. Models need not be made to work, but those that can be set in motion by means of a Crank Handle or Motor naturally will appeal most strongly to the judges, and the funnier the idea and effect of an entry, the greater will be its chance of winning a prize.

After completing their models competitors should have them photographed or make drawings to show how they are built, and to explain their movements if they are working models. These must then be sent to the address given below. They need not be the competitor's own work, but the model itself must be the result of his own unaided efforts.

The competition will be divided into two sections: A, for competitors of all ages living in the British Isles; B, for competitors of all ages living overseas. The closing date for Section A is 30th June and for Section B 31st August. Envelopes containing entries must be addressed to "*Humorous Horse and Jockey Contest,*" Meccano Ltd., Binns Road, Liverpool 13.

THE PRIZES

"Engineering of the Past" Competition

1st Prize, Cheque for £5/5/–.
2nd Prize, Cheque for £3/3/–.
3rd Prize, Cheque for £2/2/–.
10 Prizes of Meccano or Hornby products, value 10/–.
10 Prizes of Meccano or Hornby products, value 5/–.

"Humorous Horse and Jockey" Competition

The following prizes will be awarded in each Section:
1st, Meccano or Hornby products, value £2/2/–.
2nd, Meccano or Hornby products, value £1/1/–.
3rd, Meccano or Hornby products, value 10/6.

Model-Building Competition Results

By "Spanner"

More Winning Entries in the "Autumn" Contest

THIS month I am continuing my descriptions of some of the more outstanding models that won prizes for their builders in the "Autumn" General Model-Building Contest.

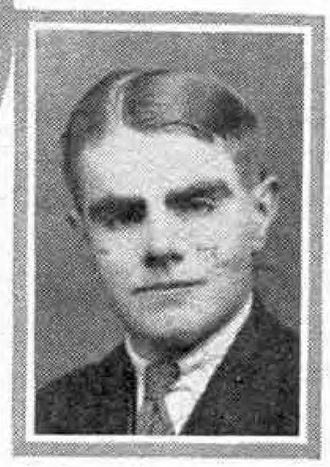
Each of the models I have selected possesses interesting or unusual features, and will provide readers with ideas that will be of value in their future model-building activities.

In my commentary last month I referred briefly to a very fine model block-setting crane for which F. G. Rich, Orpington, was awarded Second Prize. This model is shown in the lower illustration on this page, and a glance will reveal its excellent proportions and the remarkable solidity of its construction. The model is nearly 9 ft. long and 4 ft. 6 in. high, and in its construction 4,000 nuts and bolts were used. In complete working order the crane weighs 130 lb., and it will lift a load of 28 lb. at a speed of 3 ft. per minute.





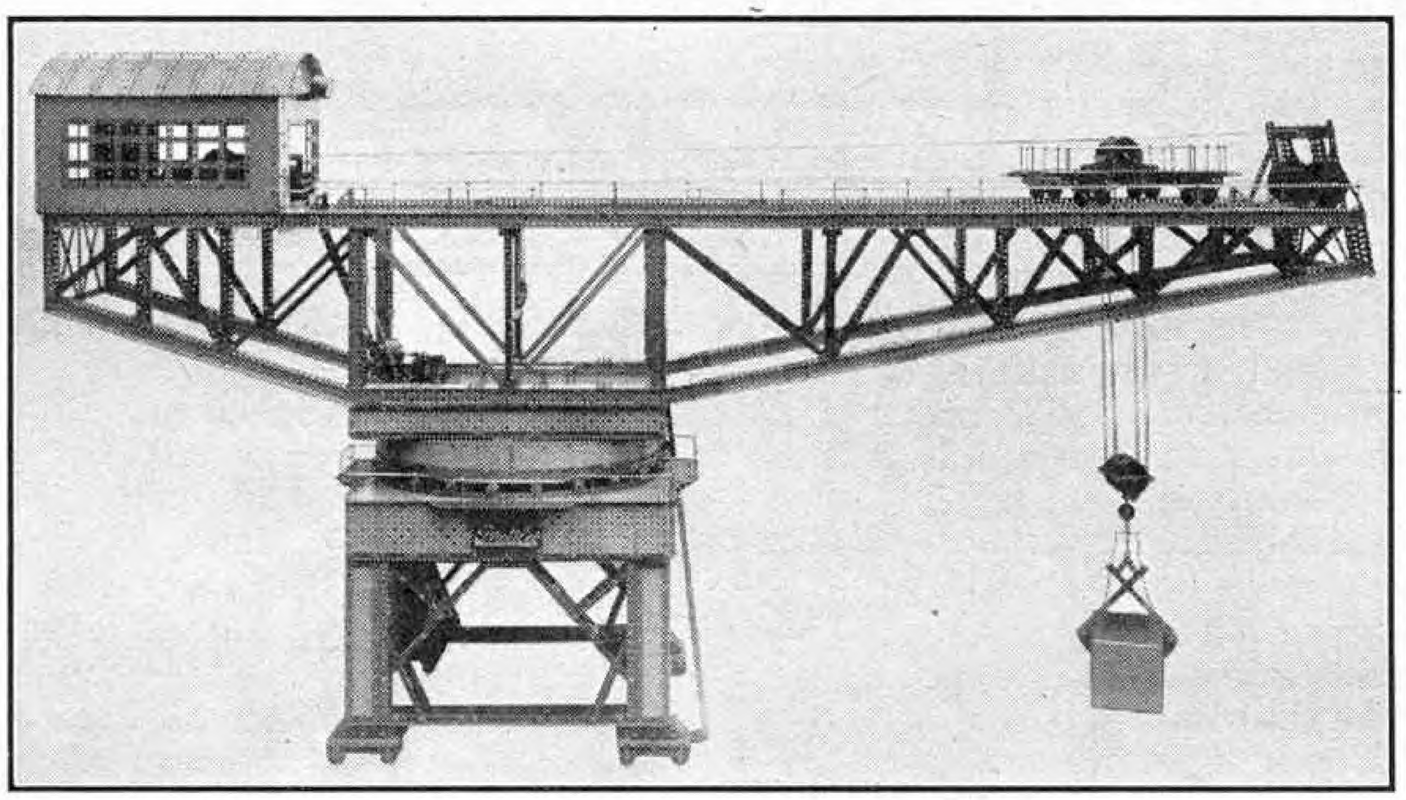




A group of prize-winners in the "Autumn" Model-Building competition. They are (from left to right): C. H. Pendlebury, Hinckley; H. Dagenhardf, Amsterdam; R. Heathcote, Dordon; R. J. Hilling, Ipswich.

The roller bearing on which the boom and superstructure is mounted is $23\frac{1}{2}$ in. in diameter and consists of 22 rollers, each of which is built up from two $\frac{3}{4}$" Flanged Wheels butted together. These wheels run on circular rails formed from $12\frac{1}{2}$" Strips.

The boom is built up from Angle Girders and is $18\frac{1}{2}$" wide. Inside the cab there is an Electric Motor that operates two cable drums, one of which controls the hoisting and lowering of the block-setting gear, while the other traverses the hoist carriage along the boom. The drums are coupled to the drive from the Motor by means of dog clutches, and the levers controlling the latter are fitted with switches, so that current is passed through the Motor only when one or both the clutches are in mesh.



All the essential features of a prize-winning model are present in this fine block-setting crane. It was built by F. G. Rich, Orpington, who was awarded Second Prize for it in the "Autumn" competition.

Another Electric Motor is provided at the top of the gantry for driving the travelling bogies. This Motor also is controlled from a lever in the cab. The hoisting tackle consists of neatly-built friction grip tongs.

One of the most popular subjects among builders of model ships nowadays is the R.M.S. "*Queen Mary*." I have seen dozens of good Meccano models of this famous liner, and one of the best is that illustrated on the opposite page, which was built by Ronald Heathcote, Dordon.

Heathcote was awarded Third Prize for this fine effort, and in my opinion this is a very creditable achievement for a boy only 12 years of age. The model is 5 ft. $9\frac{1}{2}$ in. in length, and its realistic appearance is due mainly to the fact that only the essential external details of the actual ship are reproduced. Many models of this kind are overloaded with minute details and fittings that usually are out of proportion to the main features of the model and therefore spoil its realism.

A model of a less common type is the stationary steam engine and boiler built by C. Howard Pendlebury, Hinckley, which is shown in the lower illustration on the next page. The model is a splendid reproduction to scale of a special type of steam plant known as a "Locomobile," manufactured by Marshall, Sons and Co. (Successors) Ltd., Gainsborough.

The arrangement for driving the model is most interesting. An Electric Motor is housed in the boiler and its shaft is connected by Sprocket Chain to a Wheel fixed on the crankshaft and concealed in one of the crankshaft bearings. Owing to the fact that the Motor cannot be seen, the effect of the model when in motion is very realistic.

Many competitors sent in models of various kinds of locomotives. Julio Giese, Buenos Aires, was one of these and his entry consisted of two models, one of which represents the L.N.E.R. locomotive "*Sir Nigel Gresley*" while the other is a fine scale model of the G.N.R. 4–2–2 locomotive "*No. 1*." The design of the latter is particularly pleasing, and it is interesting to note that no Flexible or Strip Plates were used in its construction, most of the work being carried out with Strips and Angle Girders. This method of construction is in striking contrast to that adopted in the model "*Sir Nigel Gresley*," the clean lines of which are

reproduced almost entirely with Flexible and Strip Plates. The model G.N.R. locomotive is full of detail and even has springs on the tender axles and brakes on the driving wheels and trailing bogie. Artillery Wheels are used to good effect for the bogie and tender wheels, and the huge driving wheels that were so conspicuous a feature of the actual engine are 6″ Pulleys.

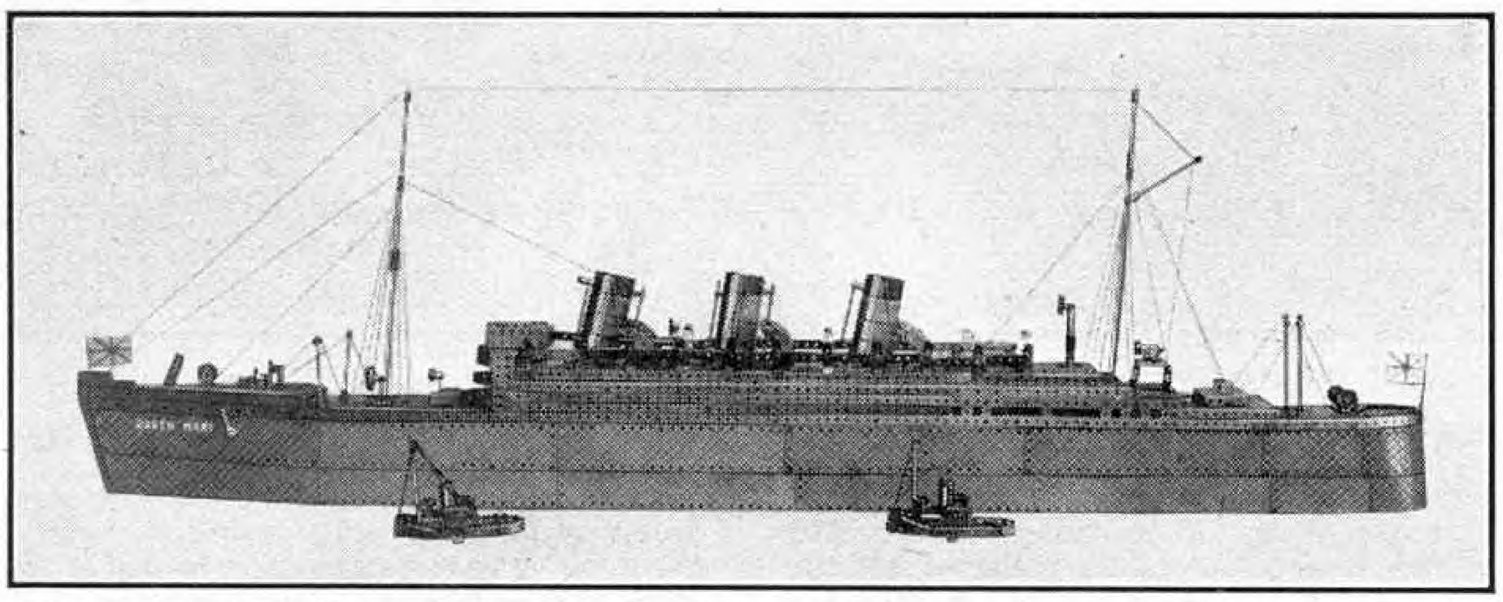
Another very excellent entry was a model of a Rolls-Royce "Wraith" saloon car, which was built by J. Matthews, Coventry. The model is approximately 36 in. in length and contains a mass of interesting details. The chassis is electrically driven, and the bonnet, which can be opened to reveal the "works," encloses a miniature model of a Rolls-Royce engine! The latter is complete with a built-up crankshaft and all the external accessories such as carburetter, intake and exhaust manifolds and radiator cooling fan.

The body of the car is fitted with seats, arm rests and picnic trays.

Several models representing architectural subjects were among the entries, and one of the best of these is a fine scale model of a church, which was designed by R. Hilling, Ipswich. It has a finely-tapered steeple 4 ft. 6 in. in height, which is built up from Angle Girders and Strips. The windows are modelled with Strips of various lengths and the pillars and porches at the front of the model consist almost entirely of Angle Girders.

L. Chitty, London S.W.20, chose one of the S.R. "King Arthur" class locomotives as the subject for his model, and he certainly made a fine job of it. The engine has an overall length of approximately 4 ft. 9 in., and its boiler is built up from Strips, which are supported on Girder Frames. Smoke deflectors made from Flexible Plates are fixed to the front of the model. The driving wheels are Circular Girders bolted to 6″ Circular Plates, and accurately modelled valve motion is fitted to each cylinder. An Electric Motor housed in the boiler drives the wheels through a three-speed gear-box, which is controlled by the regulator handle in the driver's cab.

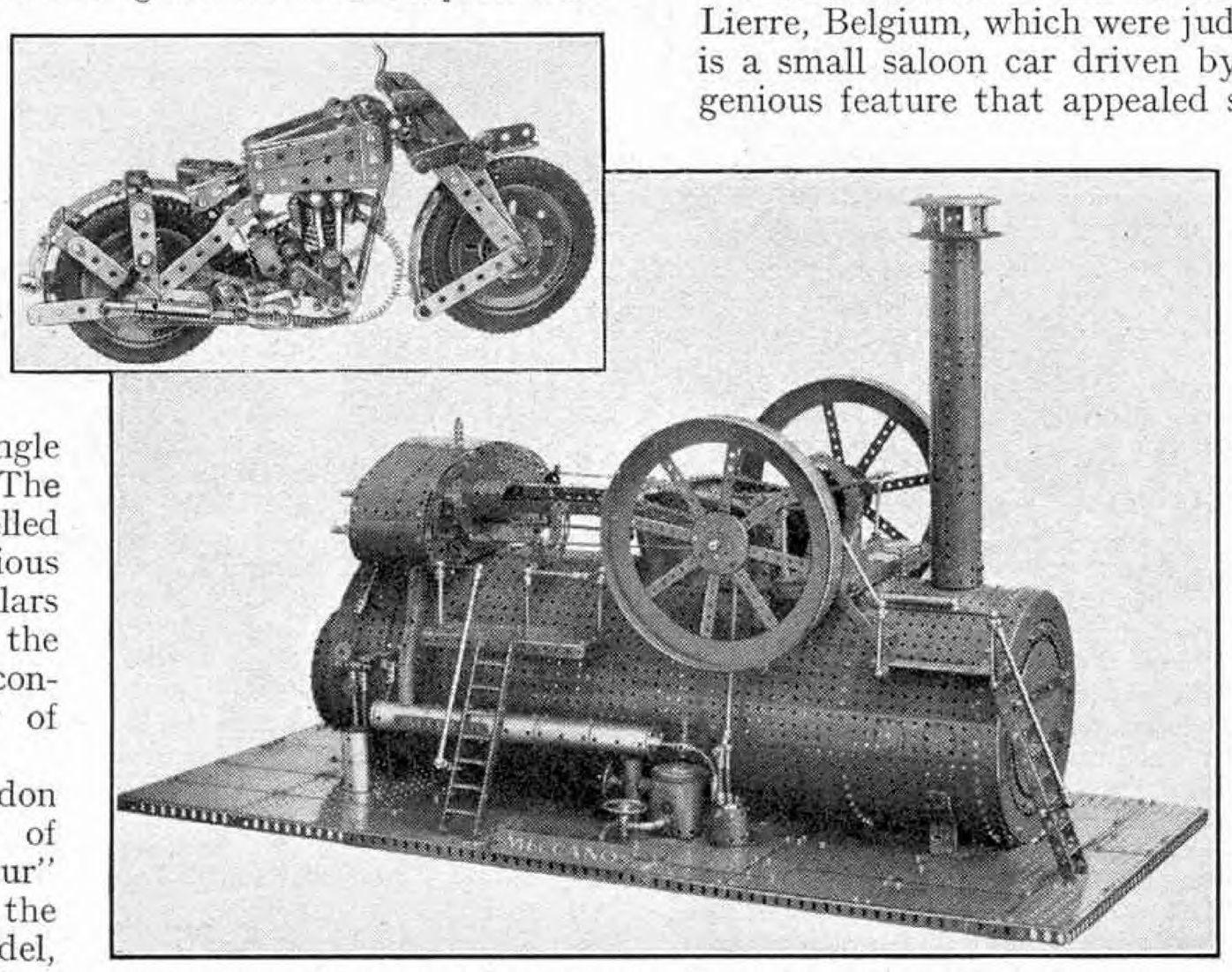
H. Dagenhardt, Amsterdam, was awarded a prize for a splendid model of a railway swing bridge. The swing span of the model is nearly 4 ft. 6 in. long, and it pivots on a small built-up roller bearing constructed in a manner similar to that used in the actual bridge. The cabin from which the movement of the span is controlled is situated high up in the centre of the swing span, and in it are accommodated the driving motor and the switches. The two approach spans rest at their shore ends on wooden piers built up to resemble railway embankments, and like the swing span they are fitted with double railway track built up from Angle Girders.



Model ship enthusiasts will find much to interest them in this excellent reproduction of R.M.S. "Queen Mary," which is the work of Ronald Heathcote, Dordon.

The locomotive "*Sir Nigel Gresley*" was chosen by P. Gilles, Montpellier, France, as the subject for his model and this entry also is a very fine piece of work. Unlike the model of this engine by J. Giese, which has already been described, this is built almost entirely of Strips. Gilles was one of those competitors who could not submit a photograph of his model, but the drawings he sent give a good idea of the fine lines and well-modelled details of his entry.

The first of two models submitted by F. Schorrewegen, Lierre, Belgium, which were judged on their joint merits, is a small saloon car driven by a *Magic* Motor. An ingenious feature that appealed strongly to the judges is that the model can be steered by remote control. The steering gear is coupled by a length of stiff wire to a controller consisting of a Steering Wheel mounted in a Channel Bearing. The controller is held in the hand, and the car can be steered to right or left as desired by turning the Steering Wheel.



C. H. Pendlebury, Hinckley, built this fine model stationary steam engine and boiler. The motor cycle shown in the small inset illustration is the work of J. L. S. Smith, Edgware.

"Amusing Models" Competition

In the December 1938 "*M.M.*" we announced details of a novel competition in which prizes were offered for the most amusing models of any kind built entirely from Meccano parts. The Contest proved very popular and the competitors who were successful in winning awards were as follows:

Home Section.

1st Prize, Meccano or Hornby products value £3/3/–: P. Daniel, Southampton; 2nd, products value £2/2/–: K. Masters, Bletchley; 3rd, products value £1/1/–: H. Coleman, Leicester.

Products value 10/6: W. Jones, Birmingham; L. Oliver, Redruth; L. Slater, Portsmouth; D. Tomkinson, Wells Green, nr. Crewe; R. Coots, Potters Bar.

Overseas Section.

1st Prize, Meccano or Hornby products value £3/3/–: E. Tapper, South Perth, W. Australia; 2nd, products value £2/2/–: P. Gilles, Montpellier, France; 3rd, products value £1/1/–: E. Feit, Johannesburg.

Products value 10/6: J. Schembri, Malta; S. Porter, Bombay; R. White, Colombo; P. Davies, Singapore; L. Edwards, Freemans Bay, Auckland.



Mystery Excursions

Boys love mysteries, and during the outdoor season a few evenings or Saturday afternoons should certainly be devoted to mystery trips. These should not always be arranged by the Leader; other officials and even ordinary members of the club also should be encouraged to plan outings of this kind and to make the necessary arrangements. It is not sufficient to take members along a route of which they know nothing beforehand. Much more even than an unusual journey is required for a mystery excursion and in particular there should be some specially exciting surprise, or feature of outstanding interest arranged as the climax of the excursion. This might be a fun fair, a place where safe boating can be enjoyed, or a hill top or other place from which a famous view is obtainable. Even refreshment rooms where a good meal can be enjoyed can be counted as a suitable climax to a ramble, and if there is some place where a few round games can be enjoyed before returning, so much the better.

Cycle runs lend themselves well to mystery excursions, which may be arranged specially for the Cycling Section, or in conjunction with a ramble for members who do not possess bicycles. For a combined mystery excursion two separate routes of unequal length have to be worked out, the longer one for the cyclists, and the junction of the two parties at some unexpected point, perhaps after adventurous journeys over unfamiliar ground, always provides a real thrill. Combined events of this kind should be arranged whenever possible, so that all members may join in the fun.

The Lighter Side

With the approach of summer I am looking forward to letters describing the brighter side of club life that becomes most prominent during the outdoor season. There are sure to be many humorous incidents during the games, visits and excursions of the summer programme, and I hope that Leaders and Secretaries will tell me all about these.

Most of the letters I receive are serious and businesslike. This is all to the good, for reports that cover the ground well and give me full details of what has been accomplished are necessary and always are a pleasure to read. I should like to know more of the lighter side of club life, however, not only in the summer, but throughout the year. At times members express their opinions freely on club matters, on other members, and even on their officials in flashes of real humour and shrewd comment that often lead to improvements in the programme and the conduct of the club. Many Leaders already write with pride of the sharp wit and friendly humour of their members, and I should like to hear more of the fun of club meetings so that I can pass on the smiles to as many others as possible.

Summer excursions give splendid opportunities for developing the social side of a club's activities, and full advantage should be taken of these. It is just as important that members should know each other well, and should put into practice among themselves the principles that lie behind the Guild aims, as that they should be good model-builders.

Meccano Club Secretaries

No. 48. A. E. Miller



A. E. Miller is secretary of the Plymouth M.C., Leader Mr. W. Ellis. This club was affiliated in October 1926, and members have many interests, including Meccano model-building, Hornby train operation, woodwork and photography. Cinematograph Shows and Lectures are regular features of the programme. The Plymouth M.C. magazine, "The Gearbox," is one of the most successful of club magazines.

The Club Room in Summer

Although a really suitable outdoor programme must be the chief interest of every club during the outdoor season, work indoors should not be forgotten entirely during the summer. Many members will be keen enough to continue model-building and train operation, and in any case the club room must be kept clean and tidy, in readiness for occupation when wet weather makes outdoor meetings impossible. The best way of preventing disappointment when some ramble or excursion that has been arranged is out of the question for this reason is to organize games in the club room, and material for these should always be kept ready. When members realise that they can fall back upon the club room, the centre of club life, on occasions such as this, they will not hesitate to turn up for visits and other outdoor activities, even when the weather is threatening, for they will know that their time will not be wasted whatever happens.

Apart from this it is advisable to overhaul club stock, and generally to "spring-clean" in the summer, when members do not become too impatient at the need for what I may call "housekeeping," because then it will not interfere so much with model-building and other pursuits as it would during the Winter Sessions. Volunteers might be called for to undertake this work, but it will be found that practically every member will be willing to do his share. Whatever is done should be carefully planned so that the club room and its contents will be in perfect order when the time comes for intensive activities indoors. This will be a great help towards ensuring a good start to the Autumn Session.

A Newark Exhibition

The Mount Senior School, Newark M.C., will hold its third Annual Exhibition in the School Hall on Wednesday and Thursday, 17th and 18th May. Besides models of all kinds built by members there will be a Hornby Railway display on the club track, which recently has been greatly improved. On each of the two evenings the Exhibition will be opened from 6 p.m. to 9 p.m., and the charge for admission will be 4d., children 2d.

Proposed Clubs

Attempts are being made to establish Meccano clubs in the following places, and boys interested should communicate with the promoters, whose names and addresses are given below.

DALKEY—J. Keyes, 3, Anastasia Cottages, Sorrento Road, Dalkey, Co. Dublin.

DUBLIN—P. Nugent, 18, St. Helen's Road, Booterstown, Co. Dublin.

LIVERPOOL—B. Edwards, Abbey Farm, Aintree, Liverpool 10.

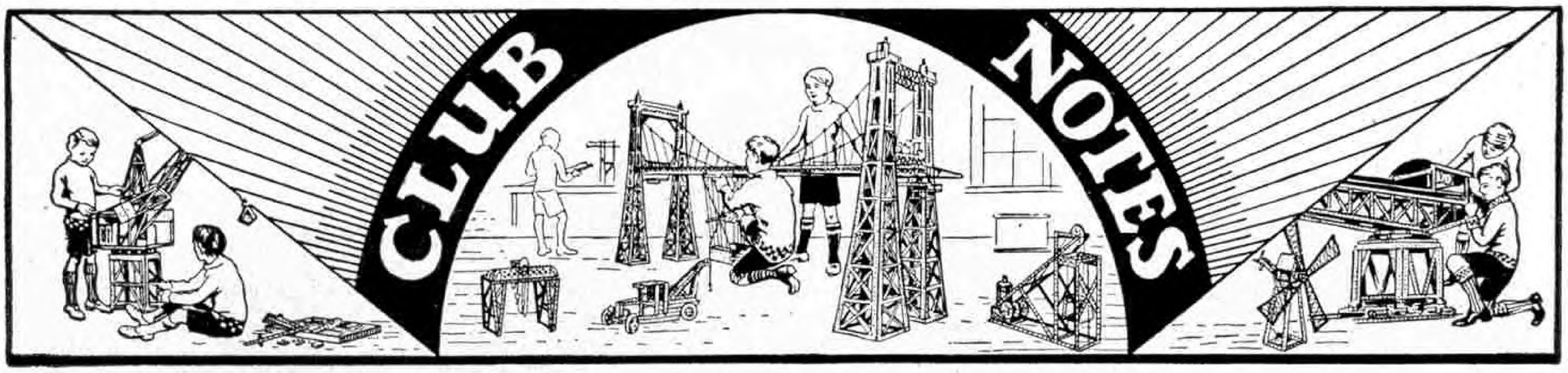
SOUTH AFRICA—J. de Villiers, "Dunrobin," Camps Bay, Capetown.

WELWYN GARDEN CITY—K. Partis, 74, Mill Green Road, Welwyn Garden City, Herts.

LONDON—Mr. F. M. Williams, Sports House Ltd., 170, Finchley Road, Hampstead, London N.W.3.

LONGPARISH—E. Kimber, 1, Council Cottage, Longparish, Nr. Andover.

NEW ZEALAND—M. J. Hart, Hora Hora, Cambridge, New Zealand.



Hele's School M.C.—A very successful two-day Exhibition has been held in conjunction with other School societies. Among the outstanding Meccano models on show was a grandfather clock that kept perfect time, a stone-sawing machine, various types of bridges, a ship coaler and a traction engine. There was also a 60-ft. electric track laid down for a display of Hornby railway working. Club roll: 12. *Secretary:* Mr. M. E. Leach, 61, West Grove Road, Exeter.

Hornsea M.C.—The sections of this active club have enjoyed Lectures, Discussions, Cinematograph Shows and Games. The Lectures have dealt with such topics as "*Ancient Methods of Engineering*," "*Salt*," and "*Aeroplanes.*" F. Hawkins gave an interesting Talk on his life in Spain, and also showed coins, stamps and letters that he had recently brought from that country. The films shown have been educational, comic and general. Two members also gave short Talks on "*A Trip on a Cargo Steamer.*" Club roll: 17. *Secretary:* F. Richardson, "Summerleigh," Esplanade N., Hornsea.

Saltash Model Engineering and Hobbies Club.—This new club has been formed as the result of a friendly division of the St. Stephen's (Saltash) M.C., which is continuing in its old club rooms. Meetings have been devoted to preparations for removal to new club rooms, and Meccano models and the electric layout have been dismantled for transit. Visits have been received from Mr. Ellis and members of the Plymouth M.C., and the Saltash club have also been to Plymouth. A very enjoyable Dance has benefited club funds. Club roll: 13. *Secretary:* B. R. J. Braund, 9, Homer Park, Saltash.

Stretford Public Libraries M.C.—Many realistic Meccano models have been built, including a flying boat, a military fighting aeroplane, a lathe, and a veteran car. A General Knowledge Test, in which the Leader opposed the "Rest," occupied a very lively evening. Interesting books on motor racing have been added to the Library. There have been excellent attendances at Lantern Lectures on "*A Visit to Bournville Works*" and "*A Journey to Switzerland.*" An interesting Talk also has been given on "*The Uses of Meccano in Engineering.*" A comprehensive Lecture on "*Stamp Collecting*" has been given to the Stamp Section by a friend of the club. Club roll: 35. *Secretary:* Miss F. Scattergood, Public Library, Technical Institute, Stretford Road, Old Trafford, Manchester 16.

Todmorden Road Central School (Burnley) M.C.—Preparations are in hand for the forthcoming Exhibition, including the construction of a large Meccano model of the Forth Bridge. Fretwork models of stations and other objects are being made, and an electric layout is being made ready by the Hornby Section. Club roll: 12. *Secretary:* J. I. Howarth, 7, Coldran Street, Burnley.

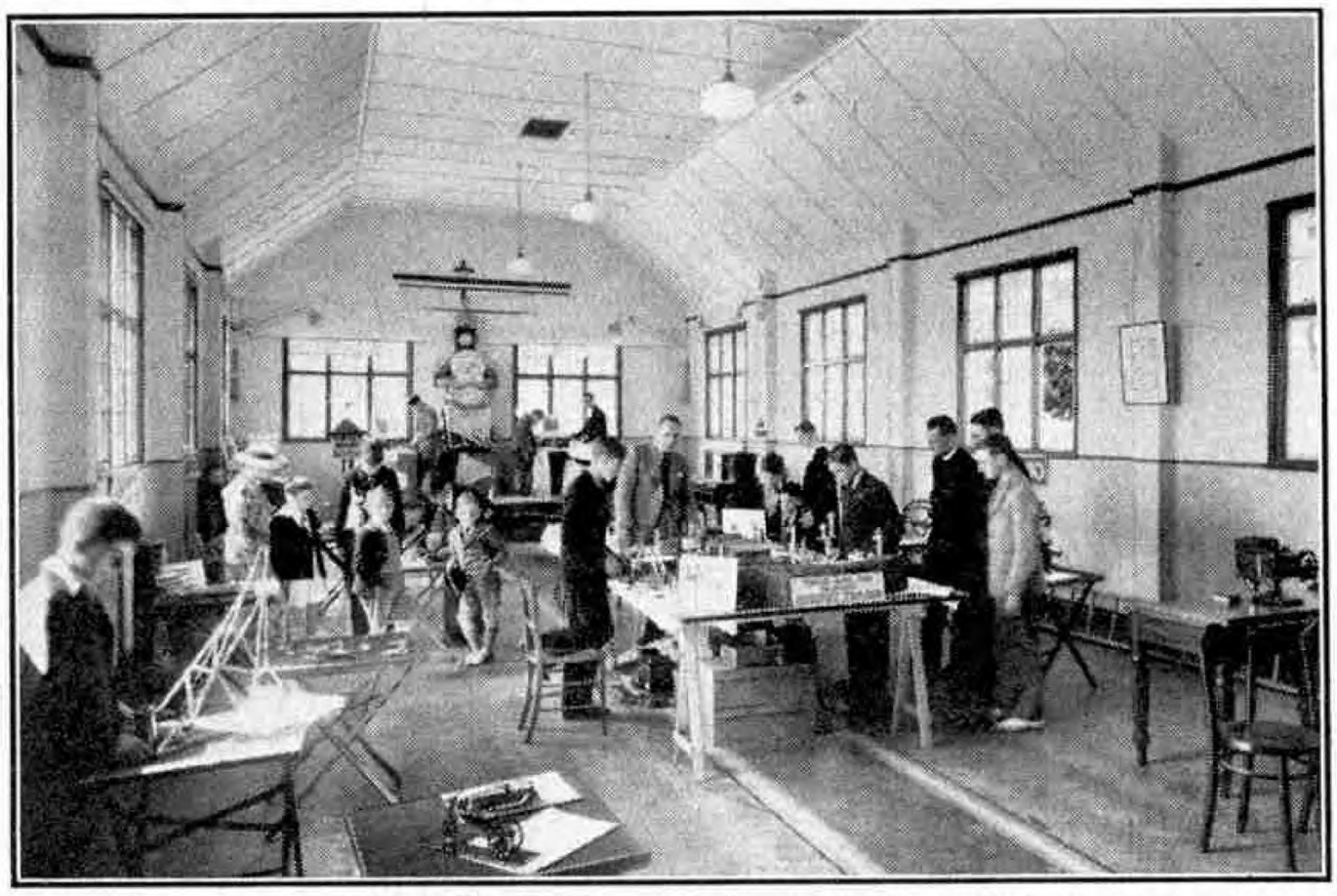
Islington M.C.—The club have moved to new headquarters. Model-building has continued satisfactorily. Hornby steel track has been purchased, and experimental running has been carried out on an extended permanent layout. *Leader:* Mr. V. Miller, 25, Bewdley Street, London N.1.

Queen Elizabeth's Grammar School M.C.—Visits have been paid to the Croydon Bell Foundry and Cadby Hall, the factory of J. Lyons and Co. Ltd. Members attended a Film Display given by the Austin Motor Co. Ltd. A Lantern Lecture on "*The Wonders of British Railways*" was greatly enjoyed. *Secretary:* R. I. E. Haynes, "Isenhurst," 127, Hadley Road, New Barnet.

Mallow M.C.—A very successful Exhibition has been held. A large model aerodrome on show was fitted with the appropriate illumination, and Hornby Paled Fencing and Hedging also improved its realistic appearance. An elaborate Hornby railway was laid down and operated by members. Club roll: 8. *Secretary:* D. Hickey, 42, Ballydakeen, Mallow, Co. Cork.

Regent Street Central School (Heywood) M.C.—Lantern Lectures have been given by Mr. G. N. Chaplin and Mr. J. P. Lunt respectively. The first dealt with York, and the slides included interesting views of the Minster, the city wall and gates, and other old buildings. "*A Holiday in Cornwall*" was the subject of the second Lecture, and members greatly enjoyed the description and slides of features of this picturesque county. *Secretary:* L. Mathews, 2, James Street, Heywood.

Folkestone M.C.—The weekly meetings have been well attended. The Fretwork Section are progressing with the construction of stations for the model railway. Model-building Contests have been commenced with great success. Meccano cranes in operation at the docks on the model layout have been thoroughly overhauled, and a new type has been evolved. Club roll: 7. *Secretary:* W. F. Cotter, 52, Hill Road, Folkestone, Kent.



A scene at the very successful Exhibition held recently by the Beeches (Jersey) M.C., Leader, Rev. Brother Stephen; secretary, H. Dubras. This club has been formed by boys of De La Salle College, and was affiliated in December 1936. Members are keenly interested in Model-building and Hornby Railway working, in addition to Lantern Lectures, sports and games. "Our Mag," the club's official organ, is a particularly well-printed and attractive journal.

Heath Grammar School (Halifax) M.C.—A Meccano model coke-screening plant was brought to one meeting for examination by members. An address on "*Standard Mechanisms*" has been given by R. Tharlow. A Drawing Competition was won by T. L. Dalzell. A short Talk on "*A Meccano Chess Set*" has been given by the secretary. An amusing Mock Trial was held at one meeting. An interesting afternoon has been spent at a colliery near Huddersfield. A Visit also has been paid to the local electricity works, and another has been arranged to the gasworks. The Hornby Section has held regular meetings, and excellent track working has been carried out on the club's fine layout. A Talk on "*Steam*" proved very interesting, and was followed by a lively discussion on the railway's "Square Deal" drive. Parents often drop in at meetings, and take an active part in proceedings. Club roll: 53. *Secretary:* M. W. Bottomley, 6, Craven Terrace, Hopwood Lane, Halifax.

Bishop Road School (Bristol) M.C.—Attendances have been excellent at the weekly meetings, and many models have been brought along for inspection and criticism. Visits have been paid to Bristol and Avonmouth Docks, and another to Fry's Chocolate Factory at Somerdale has been arranged. Excellent use has been made of Exhibition models from Headquarters for instructional purposes. *Leader:* Mr. W. H. Mahoney, 21, Springfield Grove, Bristol 6.

Coldharbour M.C.—Model-building has been keenly carried on by members, and train running on the Branch layout also has been included in the programme. An Essay Competition on "*Meccano Model-building*" produced many interesting literary efforts. Club roll: 16. *Secretary:* R. S. Hill, Anstie Farm, Coldharbour, Dorking, Surrey.

Beeches (Jersey) M.C.—Some very creditable models have been built by members, outstanding being those of J. Gardner and A. Garrick. A member's Hornby-Dublo Train Set has been operated at meetings. "Keep Fit" exercises and games are a regular feature of the programme. Club roll: 18. *Secretary:* H. Dubras, 57, King Street, St. Heliers, Jersey, C.I.

EGYPT

Cairo M.C.—A Parents' Evening attracted many visitors, who were greatly interested in the numerous activities of the club. Some 200 members and friends attended a party held in celebration of the marriage of Princess Fawzia and Prince Mohamed of Iran. A Social Evening also was spent on the occasion of the club's fourth birthday. The Leader has been awarded a Silver Medal by the Royal Society of Agriculture (Egypt), and also a diploma for ingenious Meccano models. Club roll: 38. *Secretary:* Sayed Fahmy Awad, 28, El Gezawi Street, Shoubra, Cairo.

INDIA

Egon's (Calcutta) M.C.—Members of this enterprising club recently spent an enjoyable three weeks' holiday at a local sea resort. Picnics have been held on two weekends. Model-building activities have been commenced. Lectures on "*The Progress of the Aluminium, Iron and Steel Industries in India*" have been attended. Club roll: 51. *Secretary:* Bhagat Singh, c/o Jessop and Co. Ltd., Dum Dum, Bengal.

NEW ZEALAND

Christchurch M.C.—A satisfactory report of the year's working was given at the recent Annual General Meeting, and the financial position also was satisfactory. Officers for this year were elected, and members were very pleased to welcome back Mr. J. Ancall as Leader. Members recently visited the School for the Deaf, Sumner, and gave an entertainment to the boys, which they greatly enjoyed. The secretary will be pleased to hear from Meccano enthusiasts with a view to membership. Club roll: 36. *Secretary:* D. Pratt, 102, Kerrs Road, N.E.1.

SOUTH AFRICA

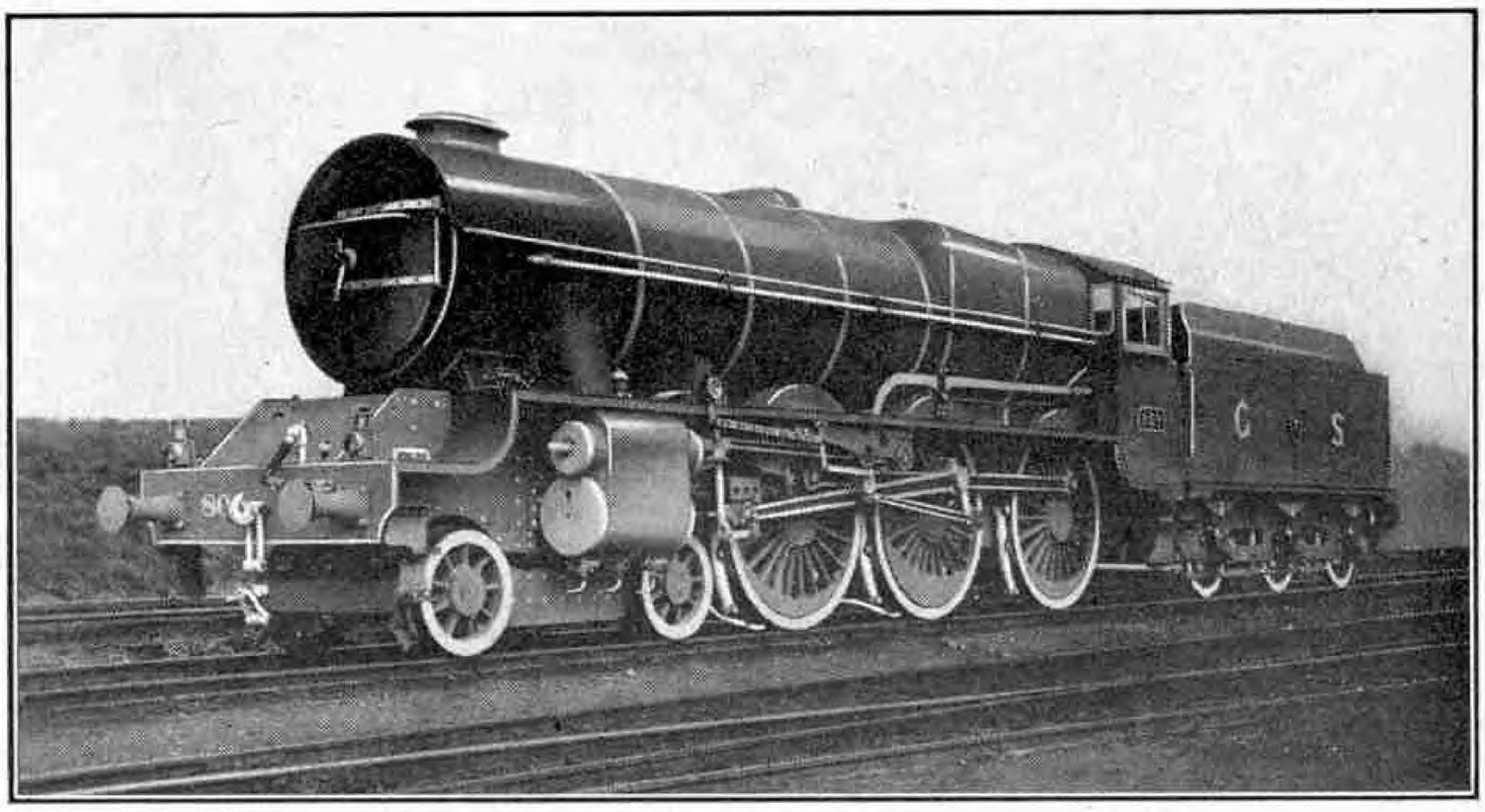
Pioneer M.C.—Meetings have chiefly been occupied with Model-building and Games. Meccano models are being built for competition at a forthcoming Show, in which prizes will be awarded for the best clockwork and the best stationary models respectively. The Air Rifle Club has commenced activities, the first shot being fired by Lt. Col. Fulford, J.P. The Thrift Club continues to give valuable service. Club roll: 8. *Secretary:* A. H. Alley, 461, Burger Street, Pietermaritzburg, Natal.

Southern M.C.—A Time-Test Model-building Contest was won by J. Lyners, a new member, with a front-wheel springing mechanism for vehicles. The competition proved so attractive that another has been arranged. A Fretwork Section has been formed, and is making good progress. Club roll: 16. *Secretary:* R. H. Moodley, 10, Stirling Street, Capetown.

Malvern M.C.—The usual Model-building, outdoor and social activities have been continued with great success. Meccano models built have included a luffing jib crane, a railway bridge and a sextant. The Session was opened with an enjoyable Social, and a moonlight ramble also has been held. On Talent Night each member had to provide a brief turn. An interesting Visit has been paid to an engineering works. A Cricket Match has been played and a Beetle Drive held. New officers were elected at the recent Annual General Meeting. Club roll: 35. *Secretary:* J. Saunders, P.O. Box 8, Cleveland, Johannesburg.

New G.S.R. 4-6-0 Locomotives

A Welcome Return to Colour



No. 800, the first of the new engines. Photograph by courtesy of the G.S.R.

THE illustration on this page shows the first of a series of 3-cylinder express passenger locomotives intended for use on the express service of the Great Southern Railways of Eire between Dublin and Cork. At the moment of writing No. 800, the first of the class, has just been completed at Inchicore Works and is undergoing trials.

The new design has been prepared under the direction of Mr. E. C. Bredin, the Chief Mechanical Engineer, and exhibits a considerable advance on the older 4–6–0 locomotives that have been employed on this route for a number of years. It is interesting to note that after experience on the principal duties with various 4–6–0s with four and two cylinders, the new engines have been given three cylinders.

The engine presents a bold but handsome appearance, and a welcome return to colour has been made by painting it green, the traditional Irish colour, relieved by black bands picked out with yellow lining. This is a notable change from the rather dismal appearance that has characterised Great Southern locomotives for many years, and helps to recall something of the distinction of the smartly-kept dark green livery of years ago. The railway's initials are prominent on the tender sides, and the style adopted forms an interesting foil to the corresponding practice on the tenders of the blue-painted engines of the Great Northern Railway of Ireland, such as that illustrated on page 205 of the *"M.M."* last month.

The design is a powerful one, with a tractive effort of 33,000 lb. at 85 per cent. of the boiler pressure. Each cylinder has a diameter of 18½ in. and the piston stroke is relatively long, being 28 in. Long-travel piston valves 9 in. in diameter are employed, and each of the three is operated by means of an independent set of Walschaerts valve gear. Special attention has been devoted to the design of the gear; certain of the bearings in it are of the needle roller type, and the outer ends of the return cranks are fitted with ball bearings.

The driving wheels conform to the usual Great Southern standard for express work, being 6 ft. 7 in. in diameter at the tread. The bogie wheels are 3 ft. in diameter and are set relatively far apart, the bogie wheelbase being 7 ft. 8 in. Roller-bearing axle boxes are fitted to the engine bogie.

The boiler, which is constructed of nickel steel plates, is necessarily a large one. It works at a pressure of 225 lb. per sq. in., and is provided with a Belpaire firebox, the roof sheet of which slopes upward from the cab end. The boiler has a barrel with parallel sides, although the outer sheeting is tapering in form. Steam is taken from the dome through a multiple-valve regulator situated in the smokebox and passes through a 28-element superheater before reaching the steam chests. The heating surface afforded by the tubes is 1,670 sq. ft., while that of the superheater is 468 sq. ft. With the firebox heating surface of 200 sq. ft. this gives a combined total of 2,338 sq. ft. The grate area is 33½ sq. ft.

The exhaust arrangements are interesting, and it is evidence of the up-to-date character of the design that twin blast pipes and a double chimney are provided. The casing is of the traditional form, but is longer than it is wide. As the illustration shows, however, this does not adversely affect the appearance of the engine.

The outside cylinders are connected to the centre pair of coupled wheels; but the inside cylinder, which is set forward, drives on the leading coupled axle. This is therefore of the cranked type, and is of built-up construction.

Two 12-feed mechanical lubricators are provided, one supplying the cylinders, and the other being connected to the axle-boxes, slide-bars and other parts. The vacuum brake, which is standard on the Great Southern Railways, is fitted to both engine and tender.

The tender is a massive vehicle and has some points of interest. Large tender capacity has been characteristic of Inchicore designs on big main line engines for some years. The new example continues this practice; it holds 5,000 gallons of water in its rustless steel tank, and carries 8 tons of coal. It runs on six wheels, the axles of which are fitted with roller bearings, and has the high flat sides of modern practice. These are set inward along the top edge, and so the tender should afford a better outlook for the enginemen when travelling backward than is possible with some high-sided designs. Behind the coal space, the tender body is cut down in height in a similar manner to the familiar Stanier tenders of the L.M.S.

The cab of the locomotive is particularly roomy—the Irish gauge is 5 ft. 3 in., it will be remembered—being 9 ft. wide inside. It is well lighted, having two sliding side windows on each side, and provides a good lookout ahead. The cab is somewhat short, and although the roof is not extended backward for any great distance, it affords ample protection for the enginemen. The cab fittings are well laid out, and among the various refinements in this part of the engine are the continuous blow-down valve and the wiper on the lookout windows. The purpose of the continuous blow-down valve is to permit a predetermined quantity of water to be blown out of the boiler continuously while the regulator is open. The object of this is to obviate the priming that is liable to be experienced from the use of softened water, owing to the scum formed by chemical action remaining on the surface of the water.

The regulator arrangement is particularly interesting. The regulator valve itself is situated in the smokebox, and it is controlled from the cab, not by means of a shaft running through the boiler, but by external rodding, the handle in the cab being of the pull-out type.

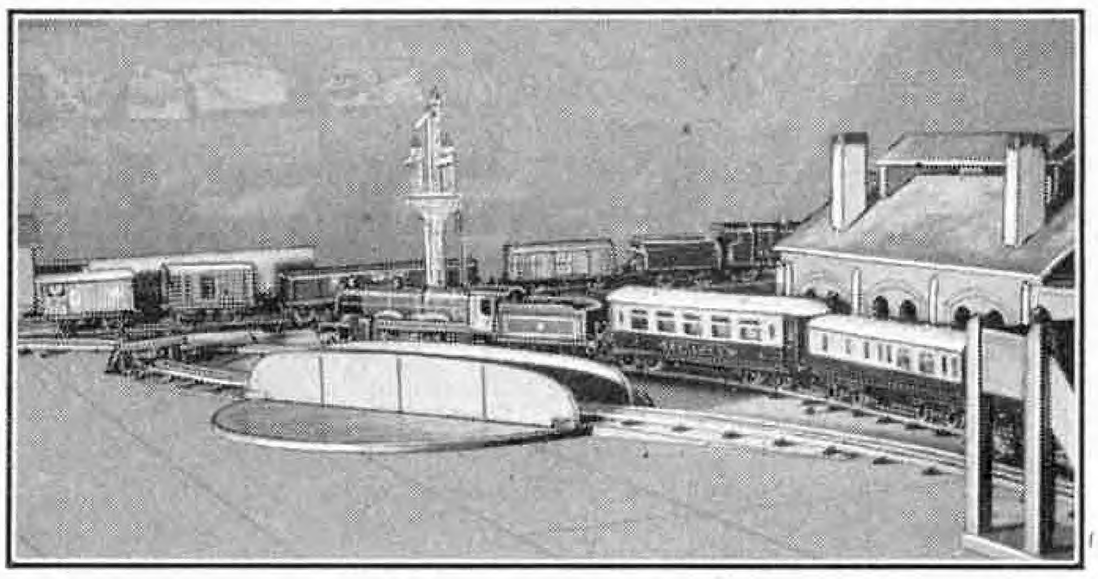
The Dublin and Cork route, on which these engines are to be used, is the principal main line of the Great Southern Railways and over it the chief trains are the *"Mails."* These trains have always had a special reputation and there is little doubt that the new "800s" will continue the smart locomotive work that has long been traditional. The need for a more powerful design than the existing engines has been felt for some time. Readers will remember that pilot assistance was taken from Dublin out to Kildare on the occasion of the run on the *"Cork Mail"* that was described by "Railway Engineer" in November 1937, for the "400" series of 4–6–0s, although big engines, are of moderate power judged by present-day standards.

The route between Dublin and Cork is severe in parts, and for up trains the start from Cork is very trying. After negotiating Cork Tunnel, the longest on the system, which is on a gradient partly at 1 in 78 and partly at 1 in 64, the line eases to 1 in 74. Then comes an abrupt rise at 1 in 60 that continues for nearly two miles. The amount of assistance necessary with heavy trains over this section should be reduced when the three engines of the new class, Nos. 800–802, are in regular service.

The present Great Southern System was formed in 1925 as the result of the amalgamation of several previously independent railways. Of these the largest and most important was the Great Southern and Western which, in addition to linking Dublin with Cork, served also Waterford, Rosslare, Cobh (Queenstown) and stretched into the south-west. The present combined system reaches Clifden, Achil and Sligo on the west coast as a result of incorporating the one-time Midland Great Western Railway.

A Fine G.W.R. System in Miniature

The Development of a Realistic Layout



An interesting view of the turntable, the design of which follows real G.W.R. practice.

SPECIAL interest is always attached to the development of those Hornby railway layouts that consistently follow the practice of a particular real railway. A splendid example of such a layout is that shown in the two illustrations on this page. The system is operated by Michael Davies of Tenby, and naturally enough the G.W.R. is the system favoured.

The railway was started some three years ago and commenced as a simple oval track on which ran a Hornby E220 Special Electric Tank Goods train. It was then laid in a room that was constantly in use, and had to be taken up after each successive spell of operations. The continual laying down and taking up of the track was not at all favoured by the "Management" and before long the railway was moved bodily to a spare bedroom. There it was allowed to grow to some extent, but again extensions made it too large to be accommodated comfortably and it was once more removed, this time to the large space beneath the rafters of the house, sometimes known as the "cock loft." The railway is there now. The space is extensive, being approximately 20 ft. square, and full advantage has been taken of the opportunities for unhindered development.

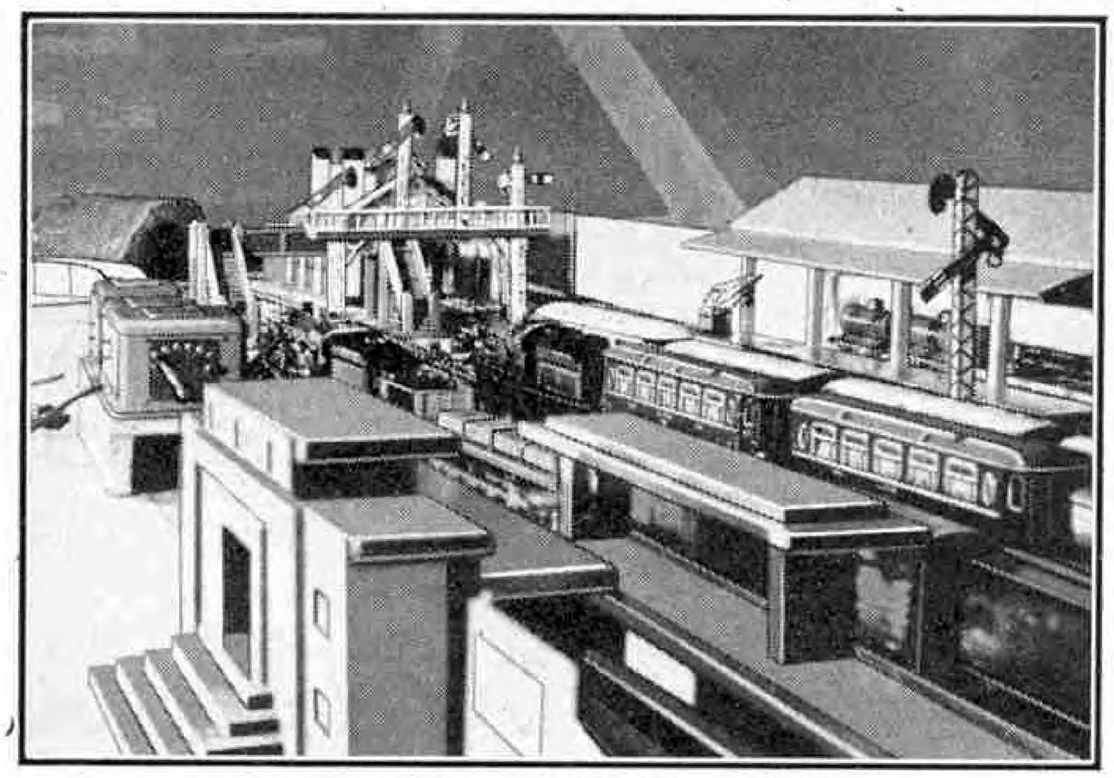
Special trestle supports have been arranged, and baseboards are laid on these at a height of 2 ft. 6 in. from the floor. The layout, which is made up almost entirely of Hornby Steel Rails screwed down to the baseboard, consists of a double track main line following the shape of the area available. A loop line runs across from one side of the track to the other, serving a through goods shed, and a short dead-end line diverging from this loop is used for the accommodation of goods rolling stock.

Within the space enclosed by the loop line and part of the main line there is a branch line leading to a passenger terminal station. This is composed of three platforms and is served by five tracks, two of these tracks being used for coach sidings. On one side of the station a short branch leads to an engine shed, and, on the opposite side there is a turntable, so that it is easy for the operator to back locomotives on to their trains straight from the depot or, in the case of engines that have been turned, from the turntable.

In addition to the terminal station there is a passing station on the main line, which has three through lines, two serving platforms and the other for use by non-stopping trains. There is also a dead-end line, the trains on which are accommodated in a bay with a platform alongside, that also can be used by trains ending their journeys at this station. All the stations, bridges and the engine shed are home-made and are wired for electric lighting. The buffer stops, of which there are nine, also are home-made but are illuminated by means of Hornby Lighting Accessories.

The rolling stock now in use totals 12 bogie Coaches and 32 Wagons and Vans of various types, all of which are of Hornby manufacture. The locomotive stud is quite a large one, and all the engines of course are G.W.R. models. For handling the principal passenger trains there are the E320 Locomotive "*Caerphilly Castle*" and the popular E220 "*County of Bedford*." Each of these is excellent for hauling trains of a heavy nature, such as miniature "Cardiff and South Wales" expresses or "Fishguard Mails," and also for use on the lighter but faster expresses. The freight traffic is ably handled by one of the powerful E220 Special Tanks, which thus fulfils the functions of the real "56XX," "42XX" and "72XX" classes of tank engines. Shunting operations, both passenger and goods, are carried out by an EM320 Tank Engine, which "stands by" when not actively engaged, ready for any emergency that may arise.

In order to obtain the best results from the layout, where several electric locomotives are required to be in use at once, the track is divided into various sections electrically. This makes it possible to operate the engines more or less independently of one another, according to the particular evolutions to be carried out and the disposition of the various sections. There are 12 section switches, all of which are at the moment placed beside the points. They are now in readiness for wiring up to a central position with the three Meccano Transformers used, and the layout will eventually be completely controlled from a central panel. Two of the Transformers, a T22M and T20A respectively, are used for train working. The third is used for lighting purposes only.



The main station on the layout described on this page.

"Midland" Operations in Miniature

Realistic Practice on Hornby Layouts

THIS month we return to a type of article that is very popular with our readers, in which hints are given for the reproduction on a Hornby railway of the practice followed on a particular section of a real system. The section chosen is the Midland Division of the L.M.S. which, as its name suggests, covers the routes of the former Midland Railway. In spite of the advance of standardisation, many of the characteristics of the former Midland line are well in evidence on this Division, which therefore offers interesting possibilities for miniature railway operations. For example the generally light formation of the trains, the moderate size of the engines and the absence of unduly lengthy non-stop runs all agree very well with the practice necessarily imposed on the miniature railway owner owing to space restrictions.



An up train on a miniature "Tilbury Section" layout. The Hornby No. 4 Station shown has been specially named to suit the actual railway represented.

Apart from this, the fact that the Hornby Series includes a splendid model of a Standard Compound in the E220 and No. 2 Special Locomotives is a strong incentive for the owner of one of these engines to devote attention to Midland matters. Although large numbers of Standard Compound engines are in use on other divisions of the L.M.S., they are still the most typical Midland express engines on their "native heath." With the Hornby Standard Compound model and with the popular No. 2 Corridor Coaches in L.M.S. colours some splendid miniature expresses can be made up that will have the neat and uniform appearance that seems to characterise "Midland" trains.

With these components a large number of interesting train services can be represented; in fact the components of the Hornby Train Sets that include the Standard Compound Locomotive, both electric and clockwork, represent *"The Yorkshireman"* of real practice. Special interest is now added to the operation of this train in miniature by the fact that the Hornby Series of Train Name Boards includes the appropriate title boards for this service. These follow exactly the latest L.M.S. practice, giving the name of the train and following up with particulars of the points between which it runs, thus, *"The Yorkshireman-London (St. Pancras) and Bradford (Exchange)."* In this connection another attractive point is the inclusion on the Hornby No. 2 Corridor Coaches of the brackets for holding these boards just above the windows. In actual practice this allows a train to be identified instantly by passengers; and in miniature an air of special distinction is given to a train displaying the boards in this manner.

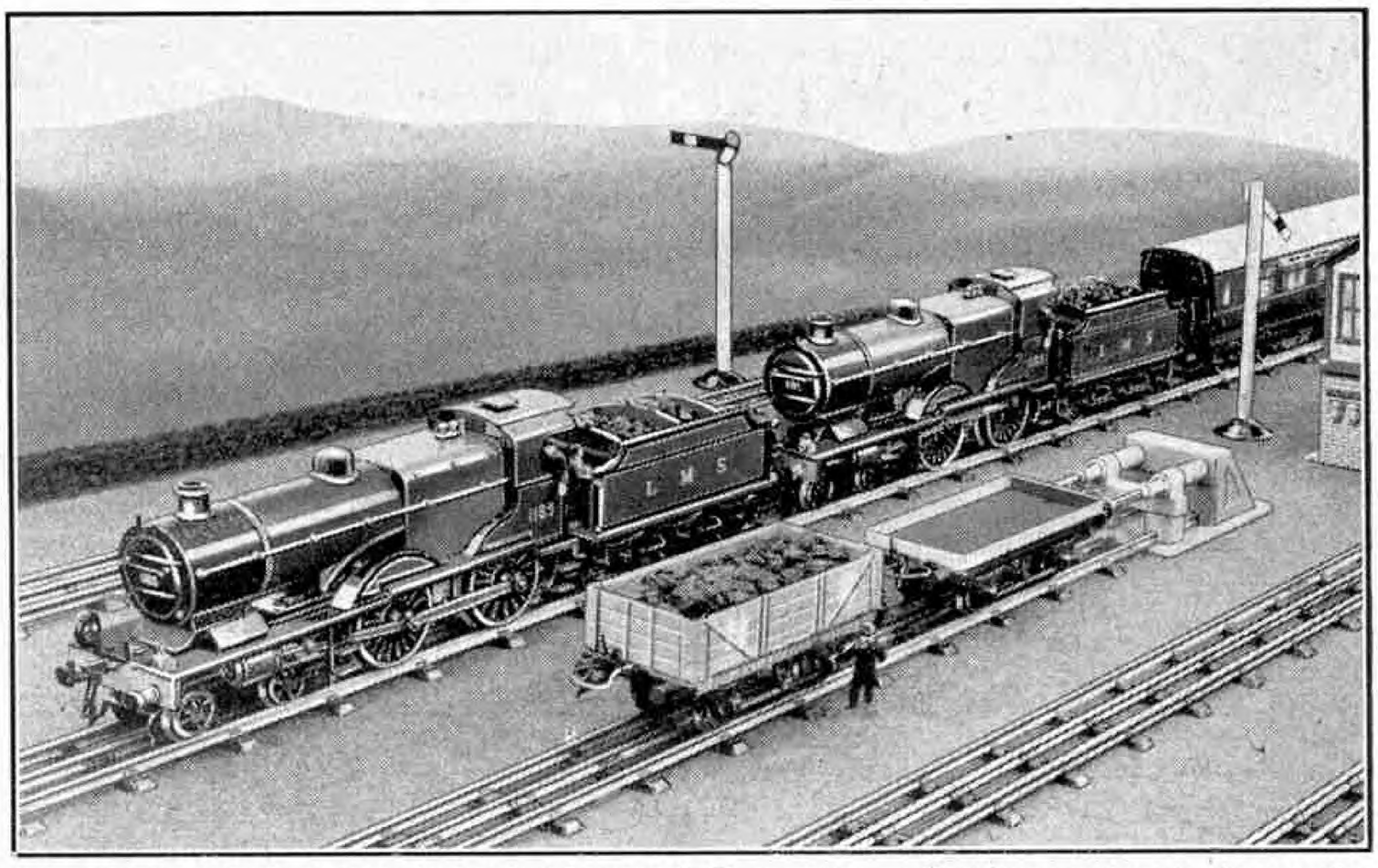
There is a great variety in the matter of routes that can be represented where this typical Midland train assembly will be suitable. Readers will recall that the Bedford School H.R.C. Branch layout, described in these pages last May, was based on the main line from St. Pancras to Leicester, and included also a branch representing the Tilbury section. The Midland Division is more extensive than its name implies. From purely Midland districts main lines reach Bristol, Manchester and Carlisle in addition to London; and there are various extensions in a sense of the Midland section proper such as those giving access to Bournemouth and Southend.

Although the 4–4–0 type of locomotive is still well in advance on Midland metals, a number of the more important trains are now in the hands of 4–6–0 types. To represent this larger type of engine on a Hornby railway a possible suggestion is to make use of the E320 and No. 3C type of engine. Although these models lack the tapered boiler fitted to the Stanier "Jubilees" and mixed traffic engines, they have the smoke deflectors that are carried by the "Patriot" class found on certain Midland duties, and are provided with the same type of tender.

In addition to the Yorkshire services in which *"The Yorkshireman"* is probably the best-known train, there is the important series of trains connecting St. Pancras, the London terminus of the Midland Division, and Manchester. There is nothing unusual about the composition of these trains, and the Hornby No. 2 Corridor Coaches represent very well the stock that is generally employed. An interesting point is that some of the trains convey through coaches destined for Liverpool and a feature might be made of this service on a Hornby layout. In miniature, where as a rule train lengths are rigidly restricted, a single Brake Composite would probably be sufficient to represent the Liverpool portion of real

practice, which usually consists of two coaches. These are worked over the Cheshire Lines metals from Manchester to Liverpool as part of one of the regular trains connecting these cities, or they may be worked in separately by an L.M.S. engine. When forming part of a Cheshire Lines train they are of course hauled by an L.N.E.R. locomotive, an interesting point that can be followed up on a model system.

The practice of naming trains has been extended to two of the important St. Pancras and Manchester services which bear the titles *"The Peak Express"* and *"The Palatine"* respectively. These particular titles are not available in the series of Hornby Train Nameboards but it will not be found difficult to prepare suitable boards consisting of strips of white card lettered in Indian ink.



A piloted train headed by two Hornby Standard Compounds. These engines are ideal for use on layouts where practice of the L.M.S. Midland Division is followed.

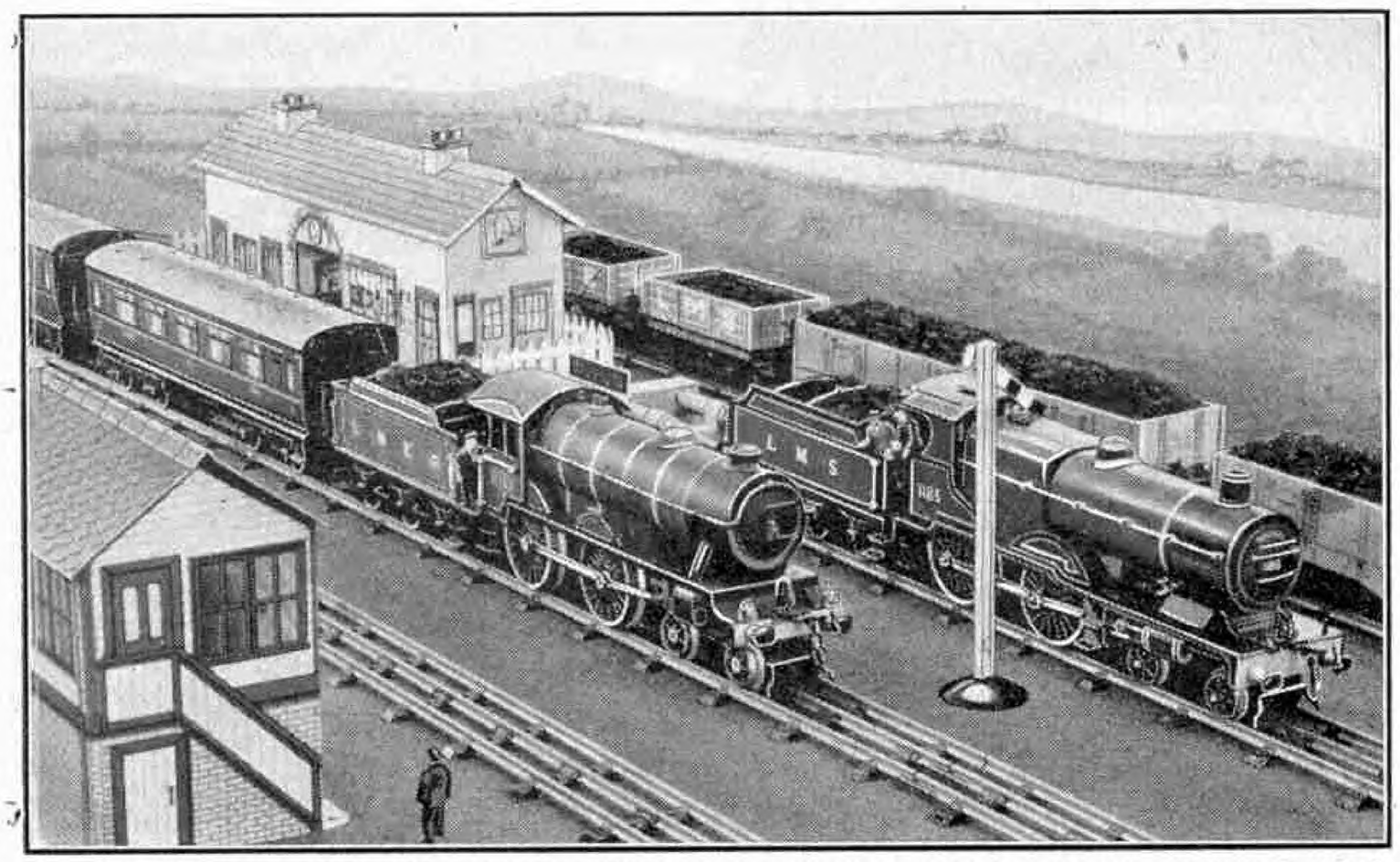
It has long been Midland practice to observe different load limits that might be taken without assistance by particular classes of locomotives on various duties. The severe gradients and the sharp timing of the trains require this limitation. Readers will remember that some details of current limits were given in the article in the *"M.M."* in December 1937 by D. S. Barrie dealing with the reorganised Midland timetable that had then recently been put into force. In spite of the provision of increased locomotive power the practice of piloting is still to be seen, though not to the same extent as in former years. There is a peculiar fascination about a piloted train and it is quite thrilling to run one on a miniature system. The best results are obtained where the two locomotives used are of similar types, or at least are fitted with similar motors.

Previous mention was made of the association of L.M.S. stock with L.N.E.R. locomotives in Cheshire Lines operations. This kind of joint working appeals to many miniature railway owners. It can be followed up in the working in miniature of the *"Thames-Forth Express,"* which runs between St. Pancras and Edinburgh via Leeds, Carlisle and the L.N.E.R. "Waverley" route. The exchange of the engine of one company for that of another takes place at Carlisle and it is interesting to be able to compare directly in this manner the motive power of the two companies. On a miniature railway where this working is carried out both L.N.E.R. and L.M.S. No. 2 or No. 3 types of locomotives can be associated. The lower illustration on this page represents the change from the L.N.E.R. to the L.M.S. locomotive. The L.N.E.R. engine is the familiar *"Bramham Moor"* model, which is quite appropriate for the purpose, as the real "D49" class engines are to be found on this section.

So far we have dealt exclusively with main line expresses. There is nothing unusual about Midland suburban services operated in various areas. The Hornby E220 and No. 2 Special type of Tank Locomotive can be used to represent the large modern tanks that have supplanted the older smaller engines on the heavier turns. Hornby No. 2 Coaches of the compartment type are ideal for suburban work.

There is one section of the Midland Division on which a heavy local traffic is operated under special conditions. This is the Tilbury Section, formerly owned by an independent company the London, Tilbury and Southend Railway. An interesting article dealing with this line and its operation appeared in the April 1938 *"M.M."* This will be found very useful by readers who intend to follow "Tilbury" practice. During the rush periods an intensive service of trains in charge of tank locomotives is worked up from Shoeburyness and other stations in the morning, and down from Fenchurch Street in the evening. Hints that we have given previously in these pages on suburban train work at short headways can be applied, and the running of trains of this kind to an actual schedule can be quite exciting.

A feature of "Tilbury" practice is the use of destination boards carried on the locomotives. A typical board reproduced in miniature is mounted on the Hornby E220 Special Tank shown in the illustration on the previous page.



Changing engines on a miniature through express. "The Bramham Moor" is about to leave the train, while the Standard Compound to take it forward waits in the siding.



FIRST SHEFFIELD.—At the Annual General Meeting it was decided to purchase more Hornby rolling stock. A temporary layout is being used for timetable working while a baseboard is under construction for a large permanent track. Track rules have been drawn up with a view to improving train running and eliminating accidents and delays. Secretary: W. B. Hutchinson, 11, Sharrow View, Sheffield 7.

ULVERSTON.—Members attend the club-room two or three times each week, and outdoor excursions also are arranged. Local railway signal boxes have been inspected, a number of L.M.S. locomotives have been photographed, and a disused local branch line has been explored. A new branch line and a turntable are to be added to the layout. Train running has been carried out regularly. New members would be welcomed, and any Hornby Train enthusiast wishing to join should apply to the secretary, J. H. Pursey, "Withersden," Rakehead, Ulverston.

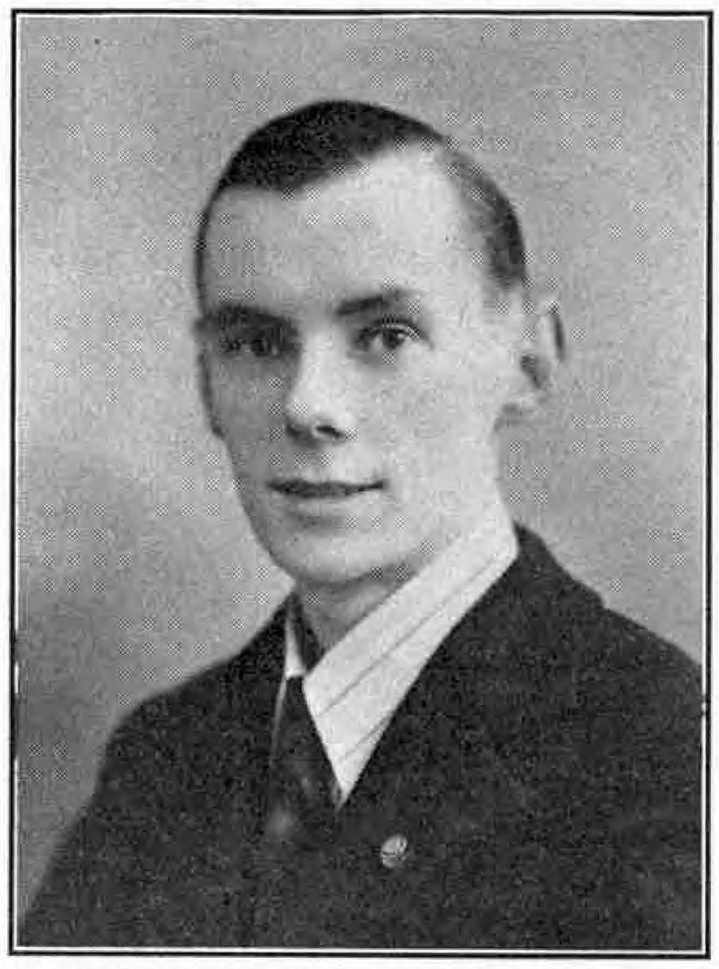
ISLINGTON.—Talks have been given on *"How Plywood is Made"* and *"Duties on a Hornby Railway."* Tinplate and steel track is available at meetings for the formation of layouts on which Junior and Senior Sections carry out train running. A game of football was enjoyed on one fine afternoon. A Games Evening was a happy diversion, and a Film Show proved very entertaining. Secretary: J. H. Cronin, 1, Aubert Park, Highbury, London N.5.

EDGBASTON.—Members attended an L.M.S. Film Show, which included a particularly interesting film taken at Crewe Locomotive Works. An extensive layout has been put down, and regular timetable working and shunting operations have occupied Track Meetings. A new station has been added to the layout. Secretary: R. L. Teare, 531, City Road, Edgbaston, Birmingham 17.

ROSEDALE (KIDDERMINSTER).—A fine layout has been built in the new clubrooms, and a large terminus station is under construction. Many accessories have been made by members, and attention is now being given to scenic effects. New locomotives and coaches have been provided, together with a variety of smaller accessories. The programme has also included general maintenance and repair work, with darts, chess and reading, and good use has been made of a gramophone recently presented to the Branch. A Canteen has been opened at which members can obtain refreshments cheaply during meetings. Secretary: A. D. Hamblin, 11c, Swan Street, Kidderminster.

ROCKPORT SCHOOL.—The Branch track has been laid on trestles, and remote control semaphore signals and colour-light signals have been installed, the former being operated from two Hornby signal boxes. Many notable trains have been run, including *"The Pines Express."* Dinky Toys on stations and at other appropriate points on the layout greatly improve its appearance. Secretary: P. C. L. Cosgrave, Rockport School, Craigavad, Co. Down.

NORWOOD.—At Track Meetings there has been heavy traffic on the line. A fine new 4–6–2 *"Duchess of Montrose"* locomotive has been introduced to work *"The Royal Scot."* An interesting Debate was held to endeavour to decide *"What is the Best Model Railway Equipment on the Market To-day?"* An excellent model of a London tramcar has been built by the Meccano Section. An enjoyable visit was paid to the Model Railway Exhibition at Westminster. Secretary: A. Sippett, 5, Moreton House, Garrett Lane, Lower Tooting, S.W.17.



Mr. B. W. Jordan, Chairman of the Norwood and District H.R.C. Branch No. 359, secretary, A. Sippett. This Branch was incorporated in November 1938, and quickly settled down to an attractive programme. An extensive new layout has now been planned, and work on this, Meccano Model-building, Lectures and Debates fully occupy meetings.

LOUGHTON.—Work on the construction of the layout has advanced satisfactorily, and a number of solenoid-actuated signals have been installed. An acceptable gift of model railway material brought the club equipment up to some 12 locomotives, 20 coaches, and 50 goods wagons, in addition to miscellaneous accessories. A Library has been formed, and some 200 books were quickly collected. A Stamp Section has been started. Secretary: G. W. Ruffell, 10, Elmhurst Way, Avondale Drive, Loughton.

DENVILLE.—Meetings this session have been devoted to the preparation of the table for the layout, the construction of a railway embankment on this, and the screwing-down of new solid steel track. Limited train running has recently been possible. Secretary: L. Adkin, "Myrtle Cottage," Fourth Avenue, Denville, Havant, Hants.

New Zealand

WELLINGTON WEST.—This well-established club was recently incorporated with the H.R.C., and it is also hoped to form a Meccano Section. An attractive model railway is being constructed, including a line with an incline of 1 in 20. "Edinburgh" station was recently completed and officially opened. Excellent timetable running has been enjoyed. A Library of 200 books has been collected. A Lecture has been given on *"Photography."* Several members paid a visit to the new marshalling yards and engine sheds at Wellington, and a number of interesting photographs were taken. Secretary: K. R. Cassells, 26, Sugar Loaf Road, Brooklyn, Wellington.

Proposed Branches

The following new Branches of the Hornby Railway Company are at present in process of formation, and any boys who are interested and desirous of linking up with this organisation should communicate with the promoters, whose names and addresses are given below.

BRENTWOOD—K. Knight, 29, Milton Road.
CHELTENHAM—H. Sandford, 59, Cleeve View Road.
COVENTRY—J. West, 9, Green Lane.
LONDON—W. J. A. Battin, 66, High Road, New Southgate.
NOTTINGHAM—G. Tearle, 88, Noel Street.
ST. ANNES-ON-SEA—B. Warburton, 16, Park Road.
GLASGOW—D. Baillie, 62, Westland Drive, W.4.
STROUD—Mr. A. Frazer, Aerodrome Lane, Cowcombe Hill, Chalford.
WARSASH—D. Hooker, Fairacre, Greenaway Lane, Warsash, Southampton.

Branches Recently Incorporated

365. BIRCHINGTON—Mr. H. C. Pettman, 30, Crescent Road, Birchington, Kent.
366. DUMPTON HOUSE (BROADSTAIRS)—Mr. R. E. F. Tendall, Dumpton House, Broadstairs, Kent.
367. SALTASH MODEL ENGINEERING AND HOBBIES CLUB—Mr. J. Edgecombe, "Tower View," St. Stephens, Saltash.
368. ST. LUKE'S (BATTERSEA) MODEL RAILWAY CLUB—Mr. J. M. Lewis, 7, Thurleigh Road, Battersea, London S.W.12.

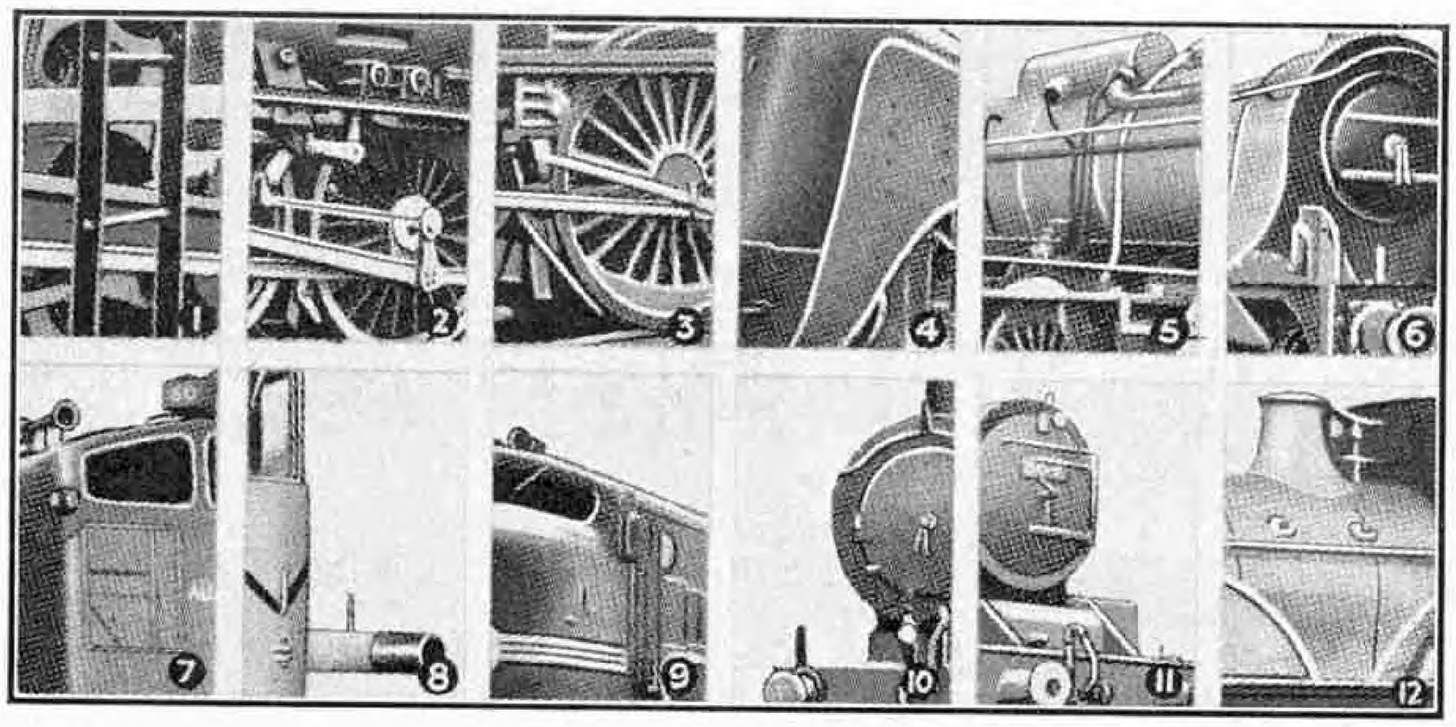
HORNBY RAILWAY COMPANY COMPETITION PAGE

Join the Hornby Railway Company and become eligible for the competitions announced on this page.

Join the Hornby Railway Company and become eligible for the competitions announced on this page.

MYSTERY PHOTOGRAPH CONTEST

Every railway enthusiast prides himself on being able to recognise famous locomotives at a glance. In many cases it is not even necessary for him to see the entire locomotive, since most engines possess some special feature that he knows to be a distinguishing mark. Similar differences in detail, apart of course from colour, also enable him to recognise passenger and goods vehicles of different railways. In our contest this month we give H.R.C. members a splendid opportunity of showing their knowledge of the characteristics of locomotives of different kinds with which they are familiar from direct observation, or from illustrations that have appeared in the *"M.M."*



The illustration on this page shows parts of 12 steam and Diesel-engined locomotives. Each section represents some prominent feature that serves as a distinguishing mark, and competitors are asked to identify the stock concerned, to name the company owning it, and to explain in as few words as possible the detail by which he identified it. Locomotives of which parts are illustrated should be further identified by giving the class to which they belong and the wheel arrangement.

To the competitor who sends in the most accurate solution a prize of Hornby Trains or any goods manufactured by Meccano Limited to the value of 21/– will be awarded. To the senders of the two entries judged next in order of merit will be awarded similar goods to the value of 15/– and 10/6 respectively. A similar set of prizes will be reserved for Overseas competitors. There will also be a number of consolation prizes in each section to be awarded to those competitors whose entries do not quite reach the standard required to qualify for one of the major prizes. On the back of each entry submitted for this Contest must be indicated the sender's name, full address and H.R.C. membership number. These items are important and should not be omitted.

Envelopes containing entries must be marked *"H.R.C. Mystery Photograph Contest,"* in the top left hand corner, and posted to reach Headquarters at Meccano Limited, Binns Road, Liverpool 13, on or before 31st May. The latest date on which entries in the Overseas Section can be accepted is 31st August.

Railway Photographic Contest No. 2

This month we announce the second of our Summer Series of Photographic Contests. Photographs of any railway subject are eligible in this, and the only restriction is that the actual exposure must have been made by the competitor himself; the developing and printing may be the work of a professional.

On the back of every print entered in this competition must appear a short description of the scene of the photograph, together with the name, H.R.C. number and full postal address of the member submitting it. Prize-winning entries become the property of Meccano Ltd. and are not returnable. Unsuccessful entries will be returned if a stamped addressed envelope of suitable size is sent with them.

The Contest will be divided as usual into two sections, for Home and Overseas members respectively, and in each will be awarded three prizes of photographic material or any products manufactured by Meccano Ltd. to the respective values of 21/–, 15/– and 10/6. A number of consolation prizes also will be awarded.

Envelopes containing entries should be marked *"H.R.C. Photo Contest No. 2"* in the top left hand corner, and must be posted to reach Headquarters at Meccano Ltd., Binns Road, Liverpool 13, on or before 31st May. The closing date for Overseas competitors is 31st August. Competitors are advised to take particular note of these dates.

COMPETITION SOLUTION

January "Mixed Names" Contest

L.M.S. No. 5531 *"Sir Frederick Harrison"*; L.M.S. No. 14768 *"Clan Mackenzie"*; L.M.S. No. 25624 *"Thomas Campbell"*; L.N.E.R. No. 4698 *"Loch Rannoch"*; L.N.E.R. No. 2563 *"William Whitelaw"*; L.N.E.R. No. 9244 *"Madge Wildfire"*; G.W.R. No. 4055 *"Princess Sophia"*; G.W.R. No. 6010 *"King Charles I"*; G.W.R. No. 3414 *"Sir Edward Elgar"*; S.R. No. 740 *"Merlin,"* or G.W.R. No. 3259; or G.N.R. (I) No. 85; S.R. No. 747 *"Elaine"*; S.R. No. 861 *"Lord Anson,"* or L.M.S. No. 5672 *"Anson"*; L.M.S. No. 5654 *"Collingwood,"* or S.R. No. 862 *"Lord Collingwood"*; L.N.E.R. No. 2568 *"Sceptre"*; G.W.R. No. 4955 *"Plaspower Hall"*; S.R. No. 915 *"Brighton."*

H.R.C. Competition Results

HOME

February "Voting Contest."—First: P. C. L. Cosgrave (53957), Craigavad, Co. Down. Second: G. Berrisford (60240), Rocester, Nr. Uttoxeter, Staffs. Third: M. R. Davies (63084), Weston-super-Mare, Somerset. Consolation Prizes: I. G. Richards (63497), Nantwich, Cheshire; M. Hoskins (16653), Exeter; D. C. Bond (30136), Eastbourne; P. W. Bryant (61850), Bath, Somerset; F. E. Saunder (1989), Folkestone, Kent; R. Ranshaw (62189), Barnehurst, Nr. Bexleyheath, Kent.

February "Drawing Contest."—First: D. G. Shadbolt (9318), Great Shelford, Cambs. Second: E. Oldham (43390), Hyde, Cheshire. Third: K. A. Cockman (27871), Wanstead, London E.11. Consolation Prizes: C. M. Dunlop (62967), Aberdeen, Scotland; G. Lodge (64006), Newcastle-on-Tyne 2; S. Hinks (51210), Camelon, Falkirk; D. Colebrook (63592), Guildford, Surrey; A. Hall-Patch (54819), High Wycombe, Bucks.; D. G. Avery (4868), High Wycombe.

February "Layout Planning Contest."—First: D. Coakham (28368), Upper Rathmines, Dublin. Second: F. Mills (31), Kearsley, Nr. Bolton. Third: R. S. Bayly (25870), Wembley, Middlesex. Consolation Prizes: A. Skelhorn (58885), Widnes, Lancs.; F. E. Saunders (1989), Folkestone, Kent; C. M. Dunlop (62967), Aberdeen, Scotland; C. E. Wrayford (6039), Bovey Tracey, Devon; A. E. Draycott (36876), Arlesey, Bedfordshire; I. Allan (38940), Staines.

OVERSEAS

November "Missing Links Contest."—First: R. Pearson (29199), Victoria, Australia. Second: D. J. White (9333), Christchurch, N.1, New Zealand. Third: W. S. Eagle (31779), Bombay, India. Consolation Prizes: I. Grayling (53250), Victoria, Australia; J. G. Gnanadurai (1964), S. India.

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10	Canada	... ...	2d.	5	Nicaragua	...	2d.
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20	,,	... ...	6d.	15	,,	...	6d.
25	,,	... ...	8d.	20	,,	...	9d.
30	,,	... ...	10d.	25	,,	...	1/-
35	,,	... ...	1/-	30	,,	...	1/3
40	,,	... ...	1/3	5	Salvador	...	2d.
45	,,	... ...	1/6	10	,,	...	4d.
50	,,	... ...	1/9	15	,,	...	6d.
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10	,,	... ...	4d.	25	,,	...	1/-
15	,,	... ...	6d.	30	,,	...	1/3
20	,,	... ...	9d.	5	Ecuador	...	2d.
25	,,	... ...	1/-	10	,,	...	4d.
5	Gold Coast	...	2d.	15	,,	...	6d.
10	,, ,,	...	5d.	20	,,	...	9d.
5	Nigeria	... ...	2d.	25	,,	...	1/-
10	,,	... ...	5d.	30	,,	...	1/3

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CANADA

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Fine packet of unused African stamps from Belgian Congo (river scene), Morocco Agencies King Geo. VI, already obsolete, Italian East Africa (Abyssinia, etc.), Sudan, Somali Coast, Kenya, Cameroons, a fine set of 5 Ivory Coast, new issue, inscribed in error 'Baloue Woman' for 'Baoule Woman'—one is already obsolete—and another set, only just issued, of French Guinea, Mozambique, etc., etc., 30 stamps in all, sent free to all genuine applicants for approvals enclosing 2d. postage. Only one gift to each applicant.

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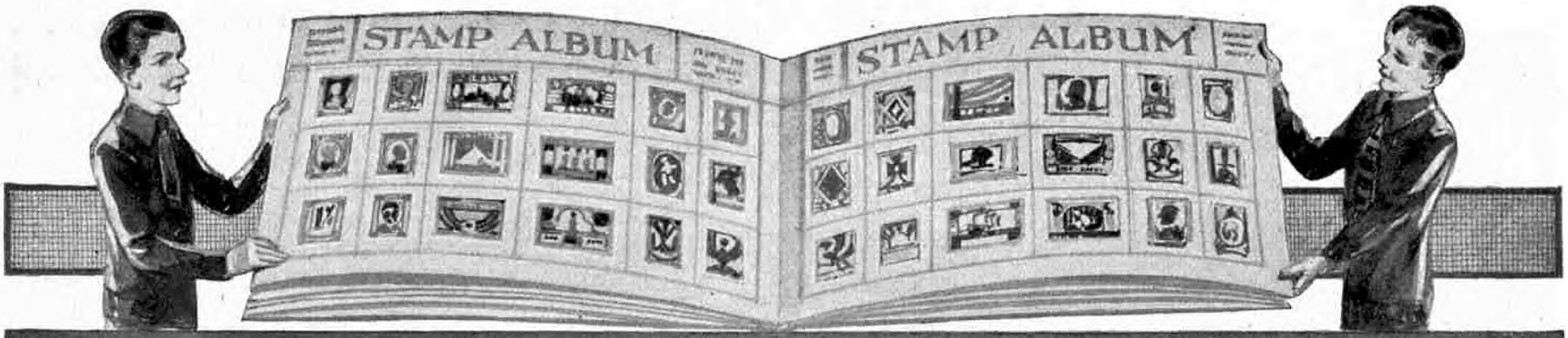
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STAMP COLLECTING

HOW COLLECTORS DESCRIBE THEIR STAMPS

OCCASIONALLY we receive letters from readers asking us to explain for them the meaning of certain expressions that we have used in our stamp articles. One or two boys have suggested that we might make a point of explaining such words whenever they appear, but it is clearly impossible to give explanations every time such a word is used. On the other hand a young stamp collector should be familiar with many of these terms, if not with all of them.

Left to himself, a boy would soon come to understand that a "mint" stamp is not one possessing gum flavoured with peppermint, but is a stamp in perfect unused condition, as sold over a post office counter. It might be quite a long time, however, before he learns that "white-back" is the description given to certain British Colonial stamps, issued during the war, when proper dyes were unobtainable, that were printed on paper coloured on one side only, the other side being white. Tinted paper used for stamp printing usually is coloured right through.

This month therefore we are explaining some of the common stamp collecting terms that may puzzle newcomers to the hobby, which they will enjoy all the more when they know what writers and other collectors are talking about.

The word "condition" is a real thorn in the side of many stamp collectors, but there is no reason why it should be so. Far too many boys include torn and dirty specimens on their album pages, although they readily admit when challenged that such specimens spoil the appearance of the page. Their removal would have the effect of making the rest of the page worth looking at, and collectors therefore should have some idea of what makes a stamp "perfect" in condition. An unused stamp is perfect if it is exactly as it left the printer—bright, clean and uncreased, with its gum untouched and, in perforated issues, with all its perforation teeth intact. Imperforate stamps must have margins as wide as possible, and no part of the frame around the design must have been cut in separating the stamp from the full sheet.

In used stamps, the word "fine" usually indicates perfect condition. Here again freshness, clearness, absence of creases, and untouched margins apply, and in addition there should have been no thinning of the paper in detaching the stamp from its envelope. The postmark should be light, and should not obscure any vital part of the design. In both used and unused stamps it is important that the design should be well centred between the margins.

A collection in which every stamp satisfies all these conditions would be something to prize, but young collectors are so largely dependent upon gifts from friends that they cannot hope to obtain so high a standard.

A separate album should be provided for "entires," a term that means complete envelopes that are to be preserved intact. Among these are air mail covers, or "first day covers," the latter being envelopes bearing stamps used on the first day on which they are issued. Many such covers



bear a device known as a "cachet," which usually takes the form of a panel containing a few words to explain the special circumstances in which the covers have been posted. Such cachets may be official ones, applied by the post office, or private ones, applied, perhaps, in the case of an airmail cover, by the company promoting the flight. The "entire" illustrated on this page is a typical "first day cover" complete with illustrated "cachet."

Air mail covers frequently bear a postmark on their backs to indicate the time of arrival. This is known as a "back stamp." Such covers should be mounted in their albums in such a manner that both the back and the front of the envelope can be inspected easily. In certain albums the pages actually consist of transparent envelopes into which the covers can be slipped and from which they need not be removed for inspection. These envelopes should not be confused with "pochettes," which are small transparent envelopes widely used by collectors as a means of mounting "mint" stamps in albums otherwise than by the aid of stamp mounts or "hinges."

"Overprint" and "surcharge" are two expressions that seem to bother young collectors, many of whom treat them as meaning one and the same thing. There is a distinct difference between them, although a surcharge is usually overprinted on the face of the stamp. A surcharge is an inscription on the face of the stamp denoting an alteration in value; an overprint is an added inscription that does not alter the face value. Overprints are used principally when it is desired to make a special stamp issue hurriedly, or in a quantity that does not justify the preparation of an entirely new issue. Typical overprints are shown in our illustrations of the South African 1d. stamp, overprinted for use in South West Africa, and the Maltese 1922 1d., overprinted to show that it can be used only for postal purposes instead of for postage and revenue, as previously.

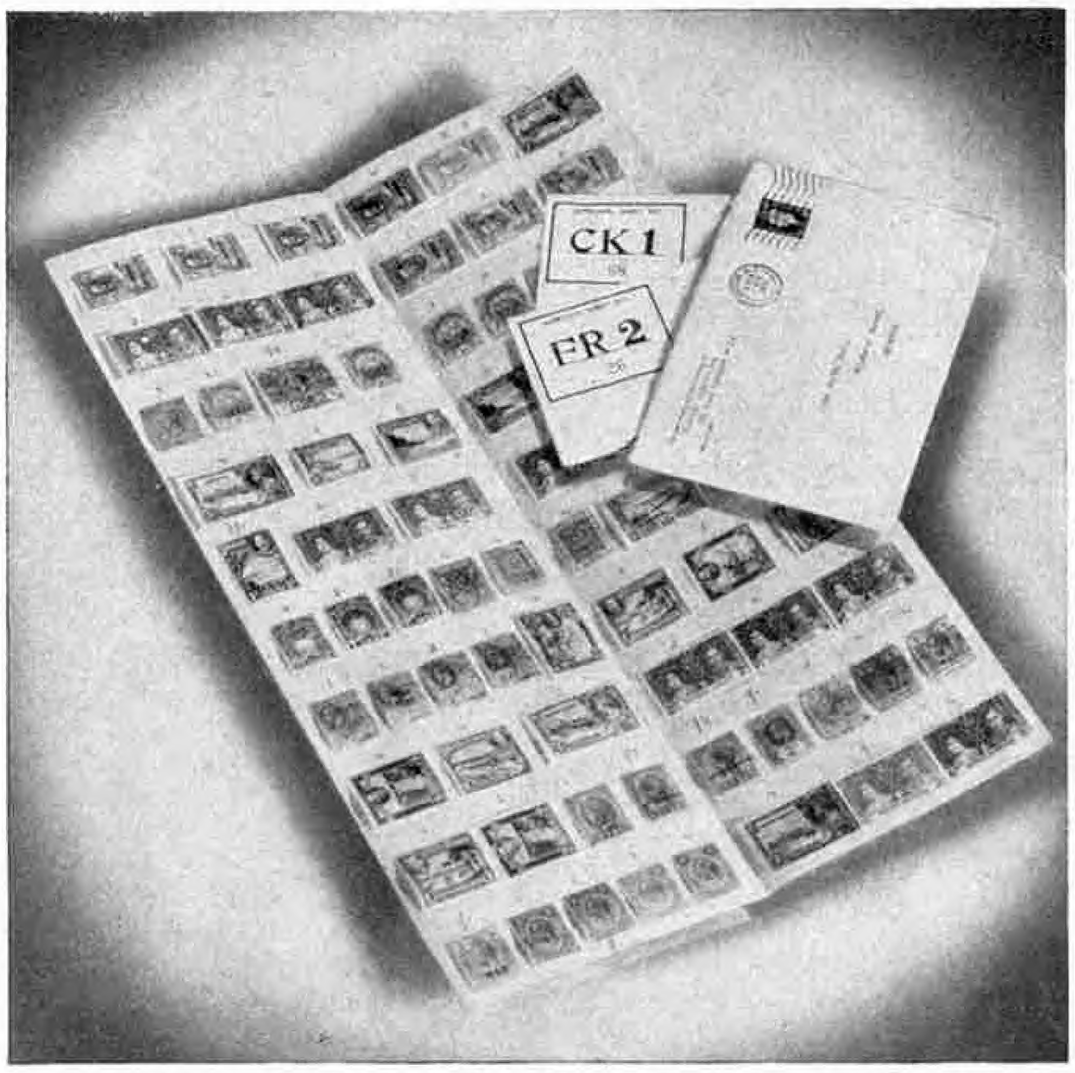
In certain cases an overprint and a surcharge appear together. This occurs when a small quantity of stamps is used for a special purpose not justifying a new issue, and the face value of the stamp is altered. Such inscriptions are referred to as surcharges, and the upper illustration on this page shows two examples of such surcharges, the Dominica ½d. stamp of 1908 re-issued in 1916 with a War Tax surcharge of one half-penny, and the G.B. 5d. of 1924 surcharged 50 centimes for use in the French Zone of the Morocco Agencies.

"Fiscals" are another strange breed that cause a little worry. They are stamps used for the payment of taxes or government fees, as distinct from stamps used to prepay the transmission of a letter, a parcel or a telegram. Certain stamps are available for both postal and fiscal purposes. The low values of most British issues are typical cases, and most of those stamps bear the



inscriptions "Postage" and "Revenue." Fiscally used specimens of such stamps usually can be distinguished by pen markings on their faces, and are not of interest to stamp collectors.

Not every stamp (Continued on page 323)



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MECCANO MAGAZINE, Binns Rd., LIVERPOOL 13

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Calibre 22 or 177. With leafsight and peepsight.
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Stamp Collecting—*(Continued from page 321)*

cancelled by writing across its face in pen and ink has been fiscally used, however. In early stamp days, and in small remote offices abroad in quite modern times, circumstances have often necessitated the cancellation of postage stamps by the simple act of writing across them. There have been cases, notably among the issues produced by the American States during the Civil War, when the local postmaster initialled each stamp personally as a certificate of its authenticity. Thus, two terms are used for stamps cancelled by writing in pen and ink, "pen cancelled" being employed for postally used stamps, and "penmarked" for stamps fiscally used.

Quite a large number of cases have occurred where stamps issued primarily for fiscal purposes have been authorised subsequently for postal use. These are known as "postal fiscals."

The young collector, knowing that stamp collecting practice is to ignore all stamps that have no postal status, may feel that it is a bit rough to expect him to ignore any fiscals that come his way, more particularly when his experience and knowledge is not enough to enable him to distinguish a "pen cancelled postal fiscal" from a plain fiscal. The best way round that difficulty is to have another album—an exercise book will suffice—into which all doubtful specimens can be placed until their identity is established. Telegraph stamps and railway stamps are other items that might go into this waste book, and it might be used also for the housing of postal stamps that are in such poor "condition" as to be unfit for inclusion in the album proper.

Royal Visit to North America

The visit of the King and Queen to Canada, Newfoundland and the United States this month will be celebrated in both British Dominions by the issue of special stamps. Canada will issue three of these on 15th May, the day on which Their Majesties are expected to arrive. The designs will show portraits of the Princesses Elizabeth and Margaret Rose on the 1c. value, a view of the National Memorial in Ottawa on the 2c. value, and portraits of the King and Queen on the 3c. value. We hope to illustrate these stamps in our next issue.



Newfoundland will issue a special 5c. stamp bearing portraits of the King and Queen flanking the Dominion Coat-of-Arms. This value has been chosen because it is the rate applicable to first class mail to the British Empire and to the United States, and also to avoid disturbing, even temporarily, any of the existing low values, the designs of which already bear portraits of members of the Royal Family. The stamp will be on sale from 17th June to 31st July.

It is understood that special stamps will not be issued in the United States.

* * *

The Swedish commemorative illustrated on this page will interest all of our readers who are keen on keeping fit. The portrait is of P. H. Ling, the originator of the system of physical exercises known as "Swedish Drill," who died one hundred years ago.

Stamp Gossip

and Notes on New Issues

Aden's New Pictorials

The new reign set issued by Aden serves also as a commemorative series, for it is almost exactly 100 years since Aden became part of the British Empire. The design, illustrated here, used for the 3a., and also for the 10a. value, shows the bombardment of the Arab defences prior to the capture of the town in 1839.



We have also chosen for illustration the ¾a. and 1a. values, which show a rider of the Aden Protectorate Levies Camel Company and a general view of the harbour, respectively. The camel design is from a photograph actually taken to provide the illustration for the Camel Company's Christmas card. Incidentally, it is in the nature of a memorial, for the Camel Company has been mechanised and its camel transport is a thing of the past.

The other designs show an exterior view of the Aidrus Mosque at Crater, just outside Aden, an Adenese dhow, and a view of Sukalla, a small port just to the east of Aden.

* * *

We illustrate on this page the very simple yet beautiful stamp issued by Poland in February to celebrate the 1939 International Ski Championships held at Zakopane. The design shows a Polish Skier in national costume gazing across a valley before making a homeward run.

Zoological Stamps for Bolivia

The Bolivian general series issued in January provides an interesting range of zoological designs, several of which feature newcomers to the stamp album.

The most attractive of the designs is the group of herons shown on the 45c. value illustrated here. This design is used also for the 40c. stamp. Another specially interesting design, used for the 60c. and 75c. values, shows the chinchilla rat, a native of the high Andes, now extensively farmed for its fur.

The full series of stamps consists of 18 stamps and the remaining designs are as follows: 2c., 4c. and 5c., llamas; 10c., 15c. and 20c., vicuna, a wild variety of the alpaca; 30c., Bolivian arms; 90c. and 1b., the toucan; 2b. and 3b., condor; 4b. and 5b., jaguar.

We thank Stanley Gibbons Ltd. for their courtesy in loaning the stamps from which the illustrations for our stamp pages have been made.

The Stamp Centenary Exhibition

The first official details of the Exhibition to be held to commemorate the centenary of the British "Penny Black," the first postage stamp, have been issued by the Royal Philatelic Society in the form of a booklet, bearing a reproduction of the "Penny Black" stamp on the front cover. The exhibition will be held at Earls Court, London, from 6th to 11th May, 1940, and will enjoy the patronage of His Majesty King George VI.

The competitive sections of the exhibition are open to all stamp collectors and there will be a special group for junior collectors not over 19 years of age on 6th May 1940, and another for collectors not over 16 years on that date. There will be two classes in each group, one for specialised collections of any country and the other for general collections or groups of countries or for special classes of stamps, such as air stamps, or pictorial stamps.

There is an open age class for collectors who specialise in collecting designs illustrating particular subjects, such as art, biography, engineering, zoology and shipping. Any subject of educational or scientific interest is eligible in this class.



Full details of the Exhibition can be obtained from the Secretary, Stamp Centenary Exhibition 1940, 41, Devonshire Place, London W.1.

The Postmaster-General has announced that it is intended to issue a set of four special stamps, of ½d., 1d., 1½d. and 2½d.



values respectively, to commemorate the centenary. Designs have been invited from 30 artists, and a panel of art experts will choose the best from these.

Dinky Toys Aeroplane Presentation Sets

The Dinky Toys announced in the advertisement on page v of this issue include two fine new Presentation Sets of miniature aircraft. The first Set (Dinky Toys No. 64) contains an interesting range of civil and military types. They are the D.H. "Comet" monoplane, Airspeed "Envoy" monoplane, the King's Aeroplane, two Hawker "Hurricane" single-seater fighters, in shadow shading and aluminium finish respectively, and the seaplane "*Mercury*." The second Set (Dinky Toys No. 65) is a more ambitious one and includes a splendid variety of modern twin-engined and multi-engined aircraft. Six of the eight models are four-engined air liners. These are the Empire Flying Boat, Pan American Airways flying boat "*Clipper III*," Junkers Ju 90, Armstrong Whitworth "Ensign," Imperial Airways "Frobisher" class machine, and the D.H. "Albatross" mail liner. A less recent but equally interesting civil type included in the Set is the Douglas D.C.3 twin-engined air liner.

Lions in the Roadway

By T. A. WADE

Visitors to South Africa should not miss seeing at least one of its game reserves. During July 1938 my parents and I toured the Kruger National Park for the second time by car. Lions use the roads in the Reserve as paths; the one that is most famous for them is that between Skukuza and Lower Sabi rest camps. The lions are not at all afraid of motor cars and the blowing of horns makes no impression on them. They will not move from the centre of the road, on which they often lie, until a car is about two yards away. Then they pick themselves up and walk to the side of the road, where they lie down again. Many cars make a detour over the grass to avoid disturbing the royal beasts.

Driving from Lower Sabi rest camp to Skukuza rest camp we met a single lioness in sight of Lower Sabi camp. A little farther on we saw three cheetah, but these are shy in their wild state and they quickly made off into a nearby clump of trees. Six or seven miles further on we met two lionesses ambling along the road towards us. After giving us one look they walked past in the opposite direction to that in which we were going.

People passing us from Skukuza direction told us of having seen a pride of three black-maned lions, two lionesses, and two cubs resting in the shade of a tree beside the road. These must have moved, for we could not find them. About 11 miles from Skukuza two lionesses appeared out of the bush. With them were three cubs in various stages of growth, two of them still having the "leopard" spots of their babyhood, and we followed these for a while.

Game is scarce on this road during the day but it is compelled to water at the Sabi river, which runs alongside the road, during the evening and early morning. This accounts for the numbers of lions and other carnivora.

In addition to lions, which are the main attraction we also saw the usual abundancy of herbivorous animals, elephants and giraffe.

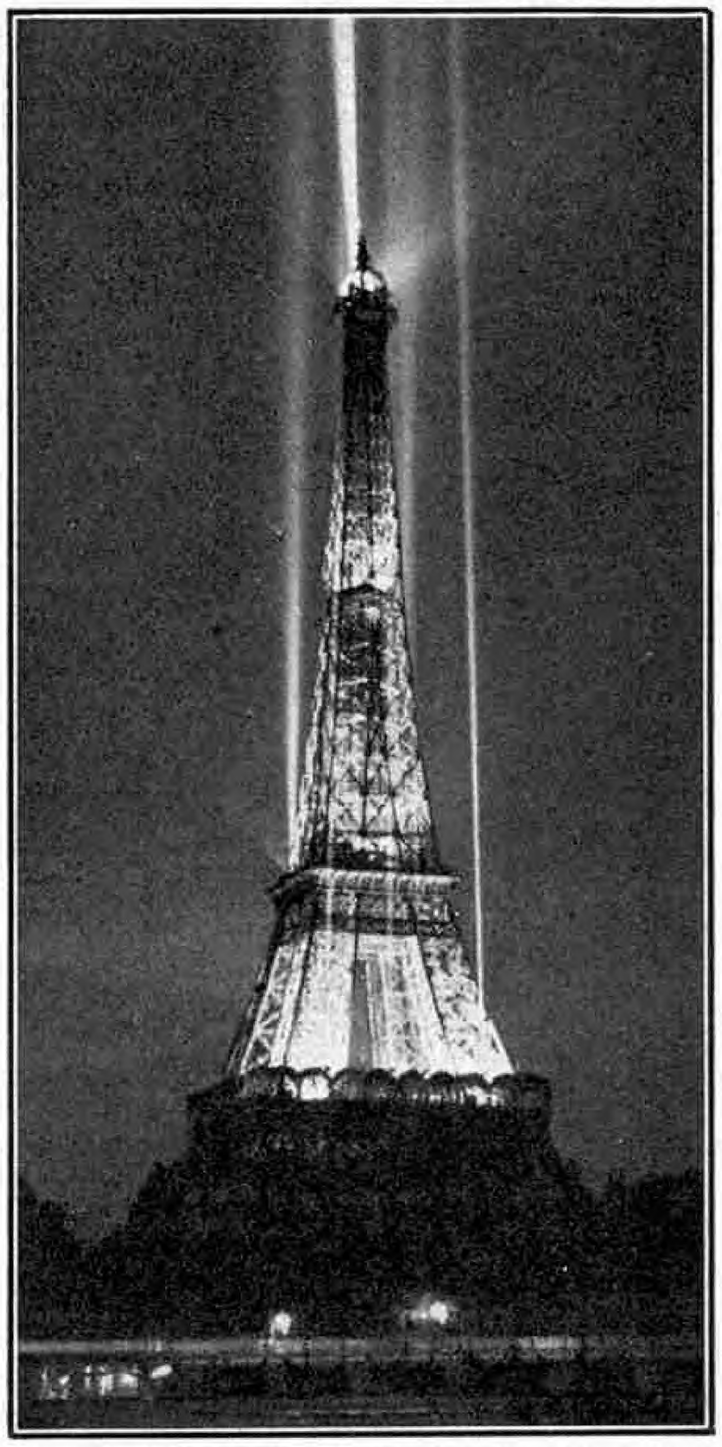
As the Bushveld, where this game sanctuary is, has a very low altitude and is as flat as a billiard table, the heat, even in winter, is unbearable. The temperature is usually over 70 deg. F. and often over 80 deg. F. In summer it is much higher.

The King and Queen in Canada—

(Continued from page 266)

the Lieutenant-Governor of British Columbia. They will then have completed the westward trip of 3,200 miles.

Eastward the journey will be similar, with some different stops, and a rest day at Jasper in the 4,200 square mile mountain game preserve of Jasper National Park. Then the Royal train goes on day and night for a week, when it reaches Niagara Falls. There United States locomotive engineers will take over, as their Majesties make a four-day State visit to Washington and



The Eiffel Tower illuminated for the International Exhibition in Paris in 1937, when it could be seen at night from a distance of more than 60 miles. Photograph by courtesy of "Le Dimanche Illustré," Paris.

New York, leaving their home on wheels. On the night of 11th June the Royal train heads north once more, crosses into Canada near Sherbrooke, Quebec, and that day travels slowly through French-Canadian towns and rural regions to the international border between Quebec and Maine.

A night crossing of the United States territory follows, and early next morning the Royal train is back in Canada, for a tour of the Atlantic coast provinces. To reach the province of Prince Edward Island the entire train will be taken aboard a car ferry, and a similar crossing will be made to reach the province of Nova Scotia, where the last stop of the Royal train will be Halifax, from where their Majesties will embark on H.M.S. "*Repulse*" for the return journey to London.

After their Majesties have gone home the train will go to Montreal shops to be repainted in the regulation railway colours; the Governor-General's two cars will be repainted on the outside, and the various cars will go into regular service once more.

Romance of Scrap Iron and Steel—

(Continued from page 287)

at the top, and two huge struts were built to take up the weight, for the structure would not have been self-supporting if this had not been done and would have collapsed. Then it was discovered that 20,000 bolts in the structure had perished, and there was nothing for it but to take these out and put in new ones in order to make sure there would be no serious accident.

George Cohen, Sons and Co. Ltd. obtain scrap of all kinds from almost every conceivable source, but perhaps the most remarkable was the enormous stock of surplus ammunition remaining in the hands of the Government at the conclusion of the Great War. This amounted to more than half a million tons, and included more than 100 million individual items such as hand and rifle grenades, rifle and revolver ammunition, detonators, cartridge cases, fuses and Véry lights in addition to projectiles of every type and calibre.

It is not safe to try experiments with explosives, and the men who broke up this material had to know exactly how to handle it. It was found that they could do seemingly dangerous things in perfect safety, however. For instance, when a fuse had become rusted in a shell filled with the explosive amatol, so that this could not be removed by the ordinary method, the shell was cut in half with a hack saw, which passed right through the explosive itself. Cast iron hand grenades filled with the same explosive were simply cracked open by hitting them with a hammer.

Mustard gas shells presented more difficulty. At first it seemed as if these would have to be dumped at sea, but an ingenious scheme was devised by which the mustard gas, which is really a liquid, could be burned out.

We are indebted to the courtesy of George Cohen, Sons and Co. Ltd. for the information in this article.

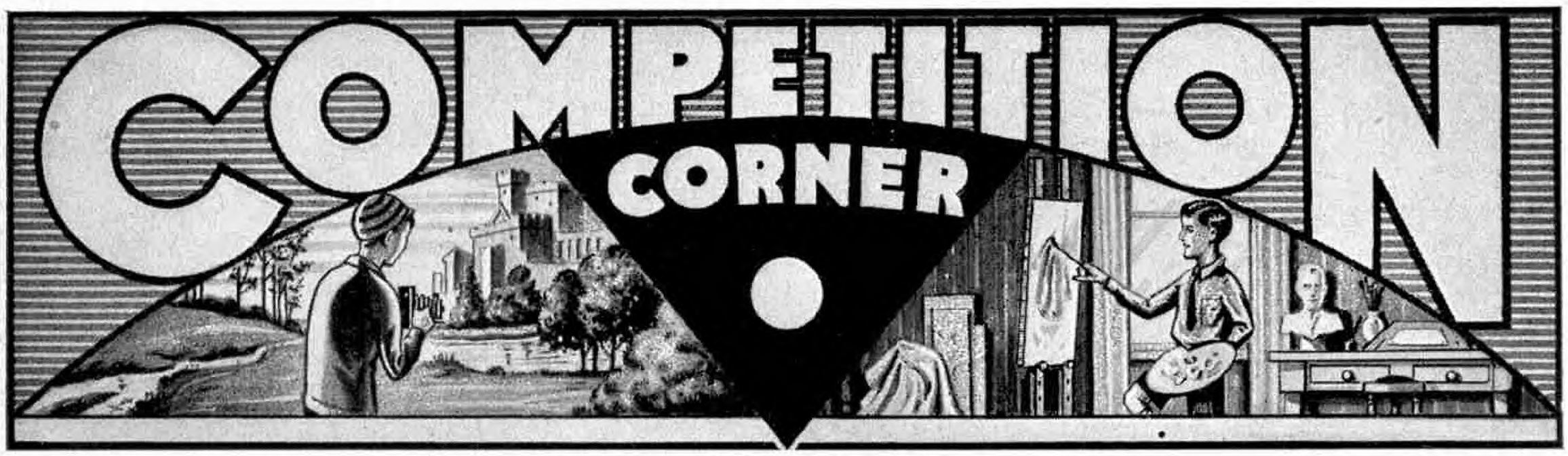
A Giant Globe

What is claimed to be the largest geological globe in the world was installed in the Geological Museum at South Kensington last year. This consists of a sphere of fibrous plaster almost 6 ft. in diameter. It is a geographical globe, and shows mountain ranges, with the main geological formations, which are indicated by different colours, light shades being used to represent the newest rocks and darker ones to distinguish the oldest. Igneous rocks, that is rocks which have at some time been fused by intense heat, appear in scarlet and orange, and ice-caps, rivers and lakes also are marked. An electrical mechanism turns the globe at the rate of one revolution in 2½ minutes.

Johnson's 1939 Photographic Competitions

Our advertisers Johnson and Sons Ltd., manufacturers of photographic chemicals, are organising a series of monthly photographic competitions, to continue until November, and readers who take part will have many excellent opportunities to make their hobby pay for itself. A different series of subjects is set each month, those for the May competition, which closes on 24th June, being Spring Flowers, Trees in Blossom and Figure Studies, indoor or outdoor.

The conditions of the competitions are very simple and free from restriction. There are no entry fees, all that is required being labels or the title panel of one of Johnson's photographic preparations. A leaflet giving full particulars will be forwarded to any interested "*M.M.*" reader who sends a postcard to Johnson and Sons (Manufacturing Chemists) Ltd., Hendon, London N.W.4.



CAN YOU READ THIS SECRET MESSAGE?

Readers who rejoice in the possession and use of secret codes will find it great fun to work out the coded message in the square on this page. The puzzle will prove an interesting teaser, although it is quite straightforward.

In this code a series of symbols represent the letters of the alphabet. The first 14 form a natural sequence of numbers, and what these are will be picked out easily from the square. The letters they represent make up two-thirds of the coded message, leaving only the symbols for eight other letters to find, for J, Q, X and Z do not occur and therefore are ignored.

The message conveyed by the code is read spirally in a clockwise direction, and will prove to be a well-known verse of poetry. The arrow is used to indicate the starting point in reading off the message, the four white dots in its feathered flight showing that a beginning is to be made in the fourth square from the arrow head, that is in the square in the bottom right corner. Boys who use this code for their own purposes will be able to vary it by means of this arrow.

D	¾	7	S	⅝	+	⅝	S	⅛	6	½	@
—	D	⅞	S	7	—	¼	S	2	⅞	I	I
7	3	%	4	⅝	6	½	⅝	⅛	+	@	⅝
4	6	¾	5	⅝	7	¾	@	I	7	⅛	¾
¾	⅛	⅝	%					⅛	%	D	4
I	¼	@	¾					6	S	@	7
⅜	D	⅛	S					3	@	I	—
2	@	S	⅝					D	7	⅝	⅝
I	2	⅞	£	⅛	6	2	⅝	2	+	÷	S
—	6	6	2	S	⅝	@	@	2	4	⅞	D
S	7	5	7	7	4	¼	I	⅜	2	I	—
⅝	+	2	S	⅛	D	2	⅝	S	⅝	%	@

Prizes of Meccano products, to be chosen by the winners, to the value of 21/–, 15/–, 10/6 and 5/– respectively will be awarded to the senders of the four most accurate solutions. There will be a number of consolation prizes and, in the event of a tie for any of the prizes, preference will be given to the entry showing the neatest or most novel preparation.

In submitting entries, the complete code must be shown as well as the decoded solution.

Entries must be addressed "*Code Puzzle*, Meccano Magazine, Binns Road, Liverpool 13," and must reach this office not later than 31st May. There will be a separate Overseas section, with similar prizes, for readers living outside Great Britain, Northern Ireland, the Channel Islands and Eire. Overseas closing date 31st August.

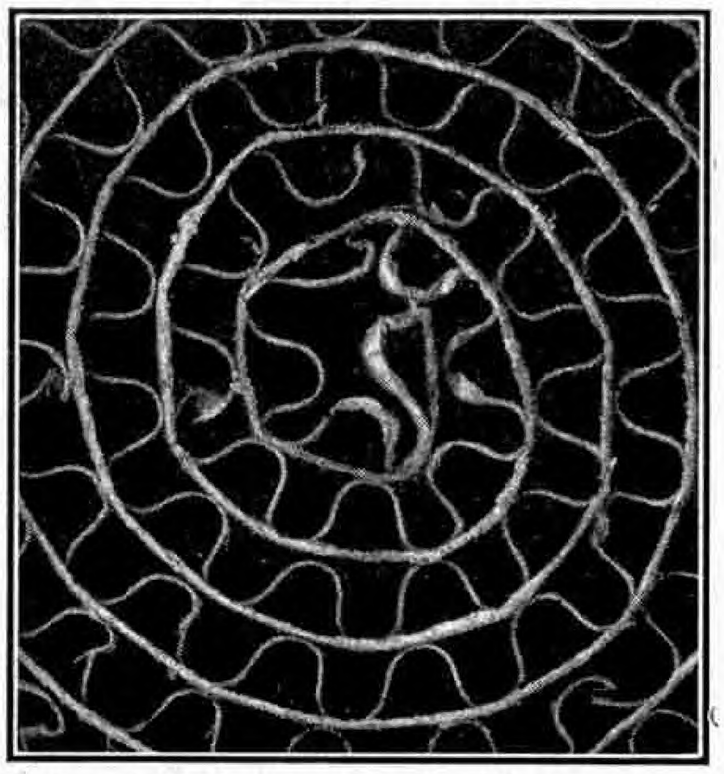
May Photo Contest

As announced in our last issue, we are running a series of photographic competitions each month throughout the summer. The conditions are very simple, the prizes being offered simply for the best photographs submitted each month. The only restrictions are that the exposure must be the work of the competitor and that each print must bear a title. Competitors may submit as many prints as they wish and they may be of any size.

Each month's entries will be divided into two sections, A for readers aged 16 and over, B for those under 16, and prizes of Meccano products or photographic material, as chosen by the winners, to the value of 21/– and 10/6 will be awarded in each section.

Entries to this month's competition should be addressed "*May Photo Contest*, Meccano Magazine, Binns Road, Liverpool 13," and must reach this office not later than 31st May. Overseas closing date, 31st August.

Whatever Is It? No. 2



Solutions to this puzzle, details of which were given in the April "M.M.," must reach the Editor by 31st May, marked "Mystery Picture No. 2."

COMPETITION RESULTS

HOME

February Stomachion Contest.—1. R. Winton (Hove). 2. G. A. Erskine (Southborough). 3. B. Robertson (Glasgow). 4. K. Oldham (Hyde).

February Drawing Contest.—First Prizes: Section A, J. L. Coleman (Bournemouth). Section B, A. Ware (Crowborough). Second Prizes: Section A, K. H. Oliver (Norwich); Section B, J. P. Tyrrell (Walton-on-Thames).

OVERSEAS

November Drawing Contest.—First Prizes: Section A, R. G. Stott (Dundas, Canada); Section B, P. W. Waddington (West Hill, Canada). Second Prizes: Section A, J. S. Stott (Toronto); Section B, T. A. Wade (Johannesburg).

November Photo Contest.—First Prizes: Section A, F. Schorrewegen (Lierre, Belgium); Section B, R. P. Sanderson (Paris). Second Prizes: Section A, T. Watson (Leichhardt, N.S.W.); Section B, N. Collins (Capetown, S.A.).

"Artificial Light" Photographic Contest (Home Section)

1st Prize, Photographic or Meccano and Hornby products value 21/–: W. Grayshan, Rawtenstall. 2nd, products value 15/–: J. Taylor, Bradford. 3rd, products value 10/6: L. Dyer, Chelmsford.

Products value 2/6: H. Pinkerton, Belfast; G. Dean, Newcastle-on-Tyne 3; F. Mills, Kearsley; E. Turner, Ashton-under-Lyne.



A MATTER OF SPEED!

Tom: "A good way to prevent an attack by a bull is to move the arms rapidly."

Jim: "Moving the legs rapidly is better."

* * * *

"Well, Tommy," asked the lad's uncle, "are you in the football team at school?"

"Yes, uncle," replied the youth. "I've got a good position. I do all the aerial work."

"Aerial work," echoed his uncle, looking rather puzzled, "what's that?"

"I blow up the footballs," was the reply.

* * * *

Guest: "I'm sure my bed is much too narrow."

Inn Manager: "That can easily be fixed. I'll have a bedspread placed on it."

* * * *

He was a loyal little fellow and he wouldn't let anything said against his parents go unchallenged. One Sunday afternoon a boy friend said, "Listen to your father snoring."

"Dad isn't snoring," was the reply. "He's dreaming about a dog, and that's the dog growling."

* * * *

A Glasgow merchant entered his office one morning and found a young clerk writing a letter in rather a flourishing hand.

"My man," he said, "dinna mak' the tails o' yer g's and y's quite sae long. I want the ink tae last the quarter oot."

* * * *

Mistress: "Did you water the rubber plant?"

Maid: "Why, ma'am, I thought it was waterproof."

* * * *

"Every bone in my body aches," grumbled the pessimist.

"Then you ought to be glad you are not a herring," responded the optimist.

* * * *

Mr. Screecher (about to sing): "What is your favourite air?"

Friend (making for door): "Fresh—and plenty of it."

* * * *

A negress walked into an insurance office and enquired, "Does you hab any of dat fire assurance heeh?"

"We do," said the clerk. "What do you want insured?"

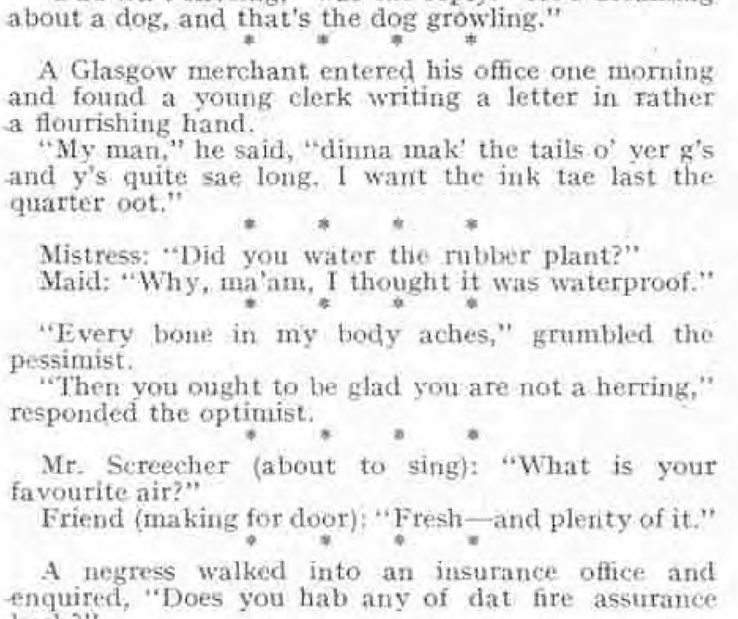
"Mah husband."

"Then you don't want fire insurance," said the clerk. "What you want is a life insurance policy."

"No, Ah don't," the woman exclaimed. "Ah wants fire assurance. Dat nigger's been fired fo' times in the las' two weeks."

* * * *

BUTTER-FINGERS!



The train roared past the station. Above the noise the stationmaster heard a yell. Rushing out to the platform he saw a man sprawled alongside the tracks. A little girl was standing by.

"Did he try to catch the train?"

"He did catch it," she replied, "but it got away from him."

HE KNEW!

Lady: "You would stand more chance of getting work if you would wash and shave and make yourself presentable."

Tramp: "Yes, lady. I found that out years ago."

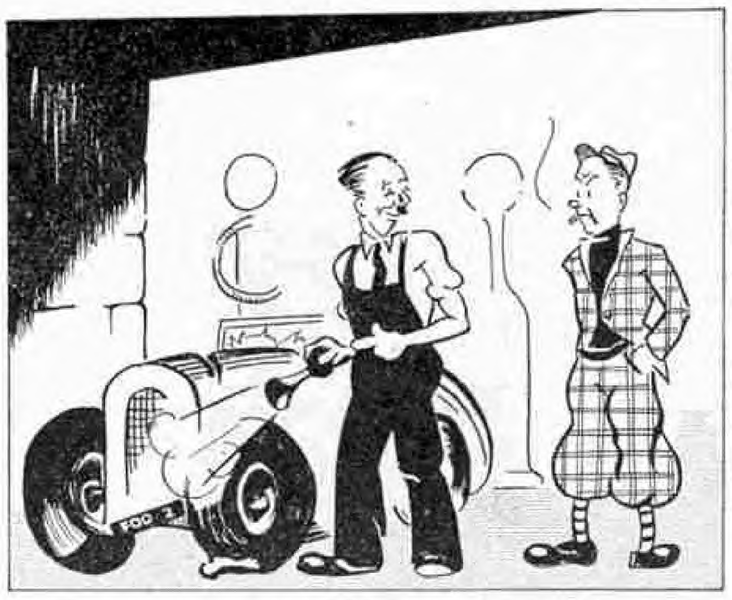
* * * *

Policeman: "Now then, you can't catch fish here without a permit."

Angler: "I am managing very well with just a worm, thank you."

* * * *

ECONOMY



The young man drove his very ramshackle old car into the garage, and asked for information about a general overhaul. The mechanic gave the car a long and searching look and finally blew the horn, which responded nobly.

"That's a nice hooter you've got there, sir," he said. "Why not jack it up and run a new car under it?"

* * * *

Teacher: "Tommy, are the skins of cats used for anything?"

Tommy: "Yes, sir."

Teacher: "Well, what are they used for?"

Tommy: "For keeping cats warm."

* * * *

"After three hours' patient fishing one competitor finally cooked a dab."

* * * *

Wandering round the factory the overseer noticed a man leaning against a wall, placidly smoking.

"You're fired!" he shouted angrily. "Go down to the cashier for a week's wages."

Later he told the foreman what he had done.

"What!" cried the foreman. "He wasn't one of our men! He was a messenger from another factory!"

* * * *

"Pop," inquired little Mose, "what am a millennium?"

"Sho!" said his parent. "Doan' you know what a millennium am, chile? It's jes' about de same as a centennial, on'y it's got mo' legs."

* * * *

Jenkins was stout with large, broad feet, and although several pairs of shoes were shown him he refused them.

"I must have square toes," he explained to the assistant.

The young man sighed wearily.

"But square toes are not stocked now, sir," he explained. "Pointed toes are fashionable this season."

Jenkins gave him an angry stare.

"That may be," he retorted, "but I happen to be wearing last season's feet."

* * * *

Conceited Comedian: "The last time I played in this theatre the audience laughed themselves senseless."

Manager: "Yes, I saw them passing out."

* * * *

THIS MONTH'S HOWLER

A barrister is a thing used to keep the crowd back.

A MISUNDERSTANDING

Caller: "I'd like you to paint a portrait of my late uncle."

Artist: "Bring him in."

Caller: "I said my late uncle."

Artist: "Well, bring him in as soon as he gets here."

* * * *

Father: "You don't seem to be doing too well at school, my boy."

Son: "And you didn't get a rise at the office this year, did you, dad?"

* * * *

Father: "Tell me the names of six animals that live in the Arctic regions."

Son: "Three bears and three seals!"

* * * *

"I don't think you have studied your geography, Dick!"

"No, sir, Dad says the world is changing every day, so I didn't think it was worth the trouble."

* * * *

Pat: "I want to buy a bed."

Furniture Assistant: "A spring bed, sir?"

Pat: "No, begorra: wan as oi can slaip in all the year round."

* * * *

Despairing Teacher: "Willie, Willie, whatever do you think your head is for?"

Dull pupil (after a pause): "Guess it must be to keep my collar on, sir."

* * * *

"Are you going to take all this lying down," boomed the election candidate.

"Of course not," said a voice from the rear of the hall. "The reporters are doing that."

* * * *

Teacher: "Tell me what a monkey can do."

Bob: "Climb up a tree, sir."

Teacher: "Yes: anything else?"

Bob (after a long pause): "Yes, sir—climb down again!"

* * * *

Professor: "Prove that the square of the hypotenuse is equal to the sum of the squares of the other two sides of the triangle."

Student: "Let's not waste time professor, let's admit it."

* * * *

"Please," said the small boy, "have you got any castor oil?"

"Yes, sonny," said the shopkeeper. "How much do you want?"

"None, thank you. I'm looking for a shop that's sold out."

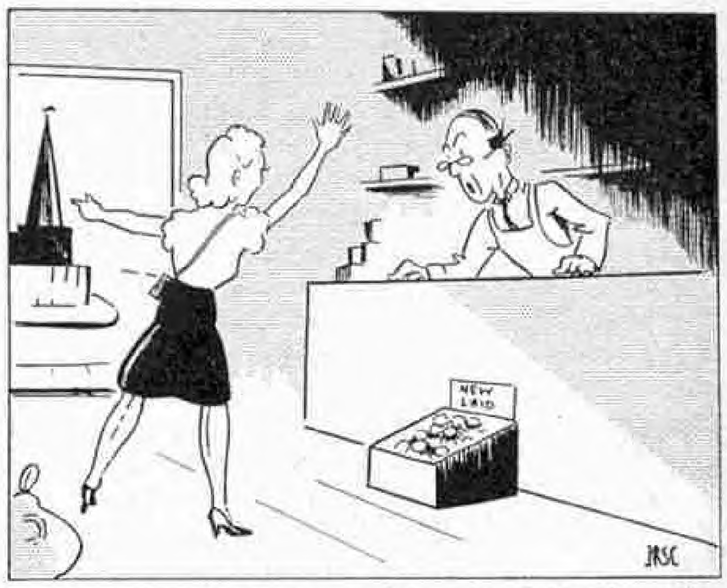
* * * *

"How can I drive a nail without banging my fingers?"

"Hold the hammer in both hands."

* * * *

A CHANCE FOR A "SHOT"



"I say," cried the young girl as she dashed into the village store, "father's being chased by a bull!"

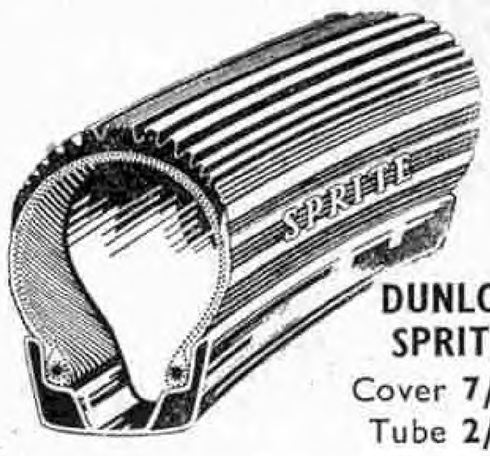
"Good heavens! What shall I do, miss?"

"Give me a roll of film for my camera, quick!"

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Tube **2/6**

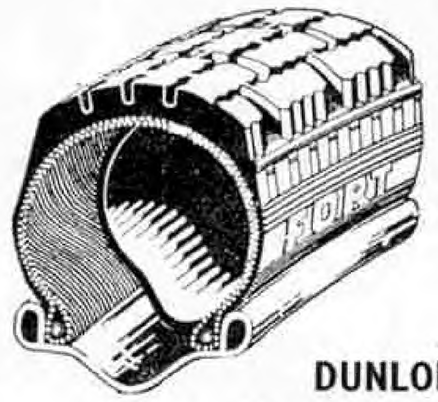


DUNLOP SILVER SPRITE
Cover **7/6**
Tube **2/6**

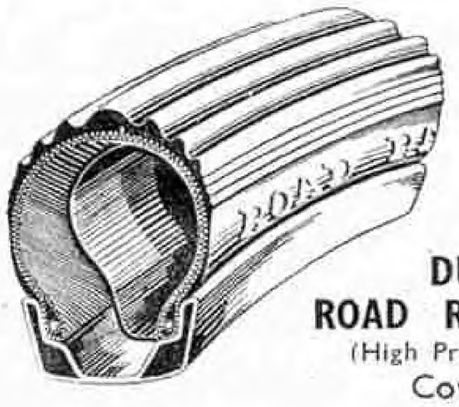
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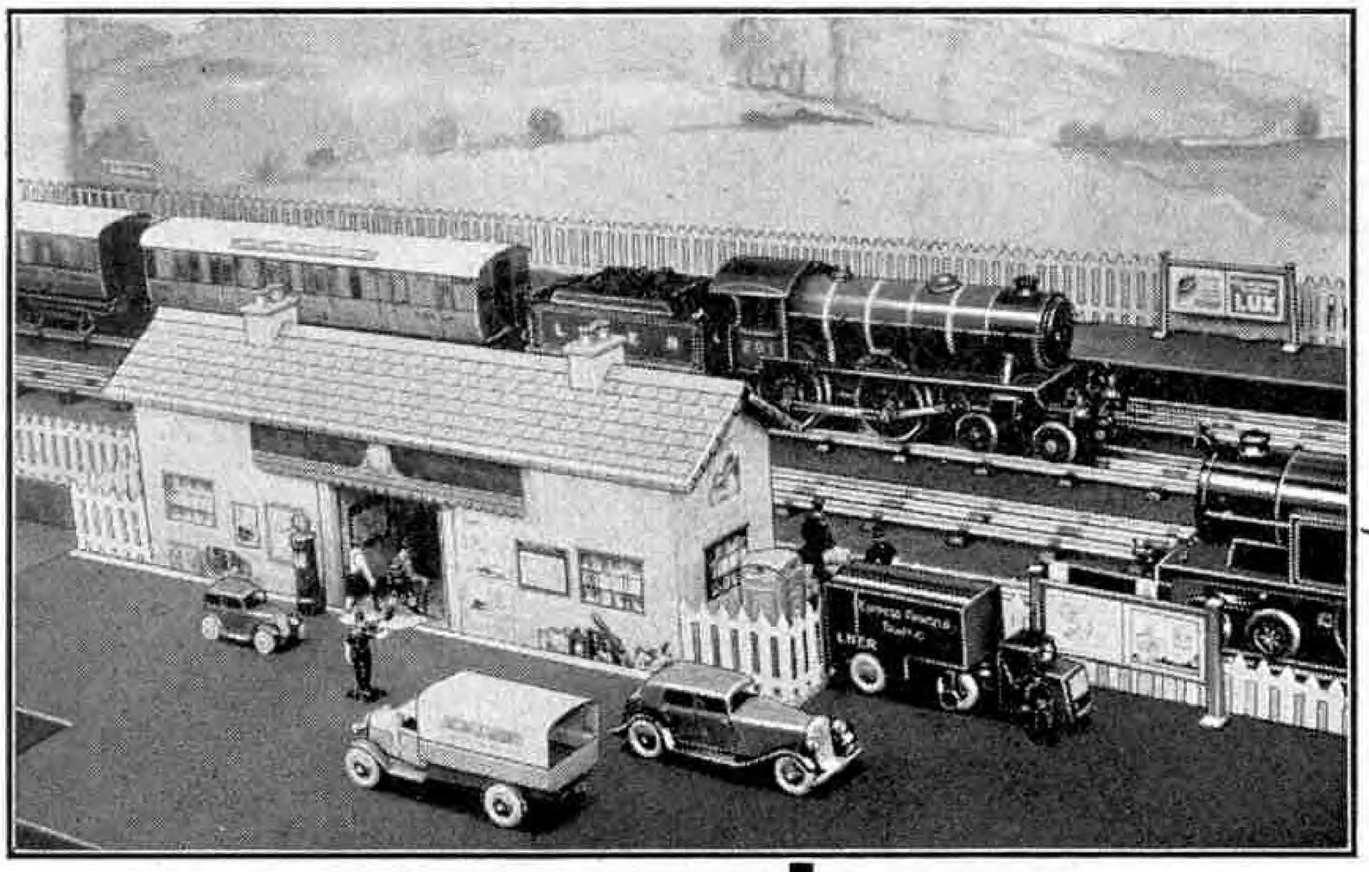


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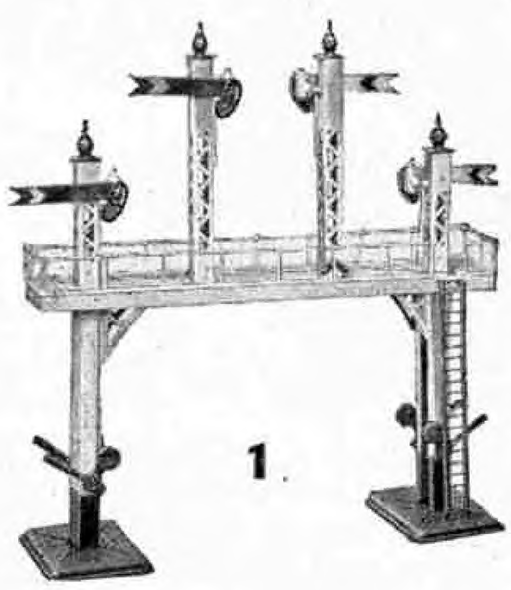
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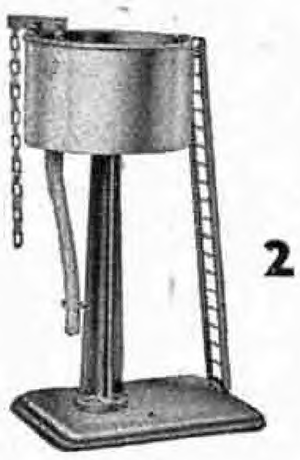
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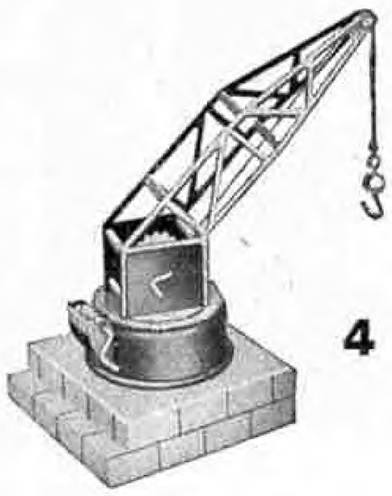
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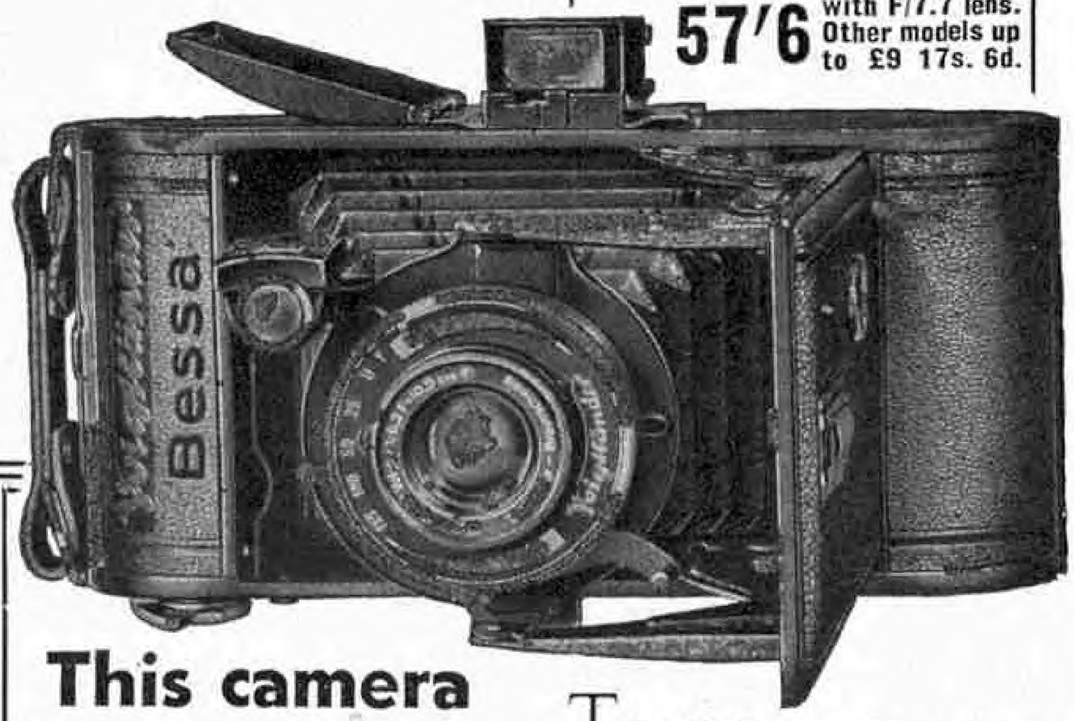


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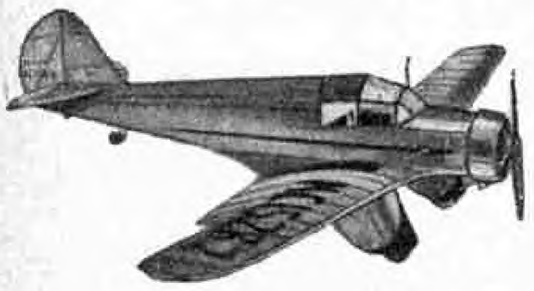
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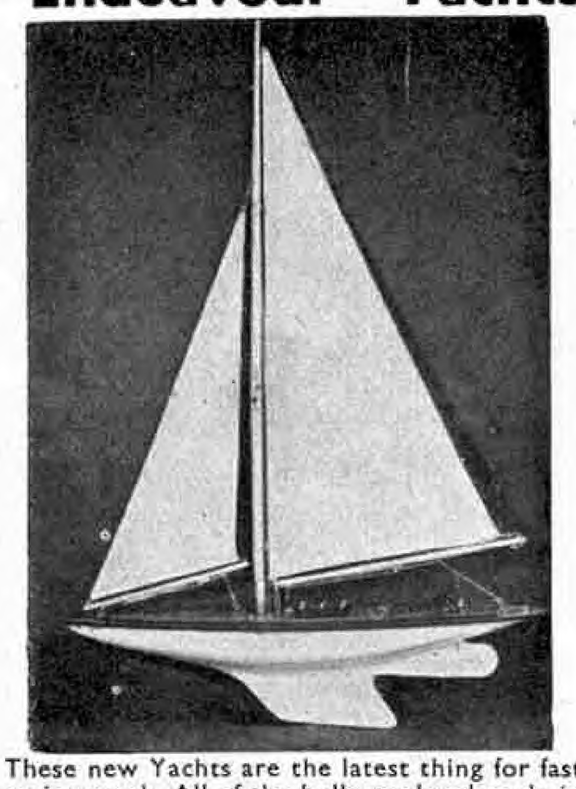
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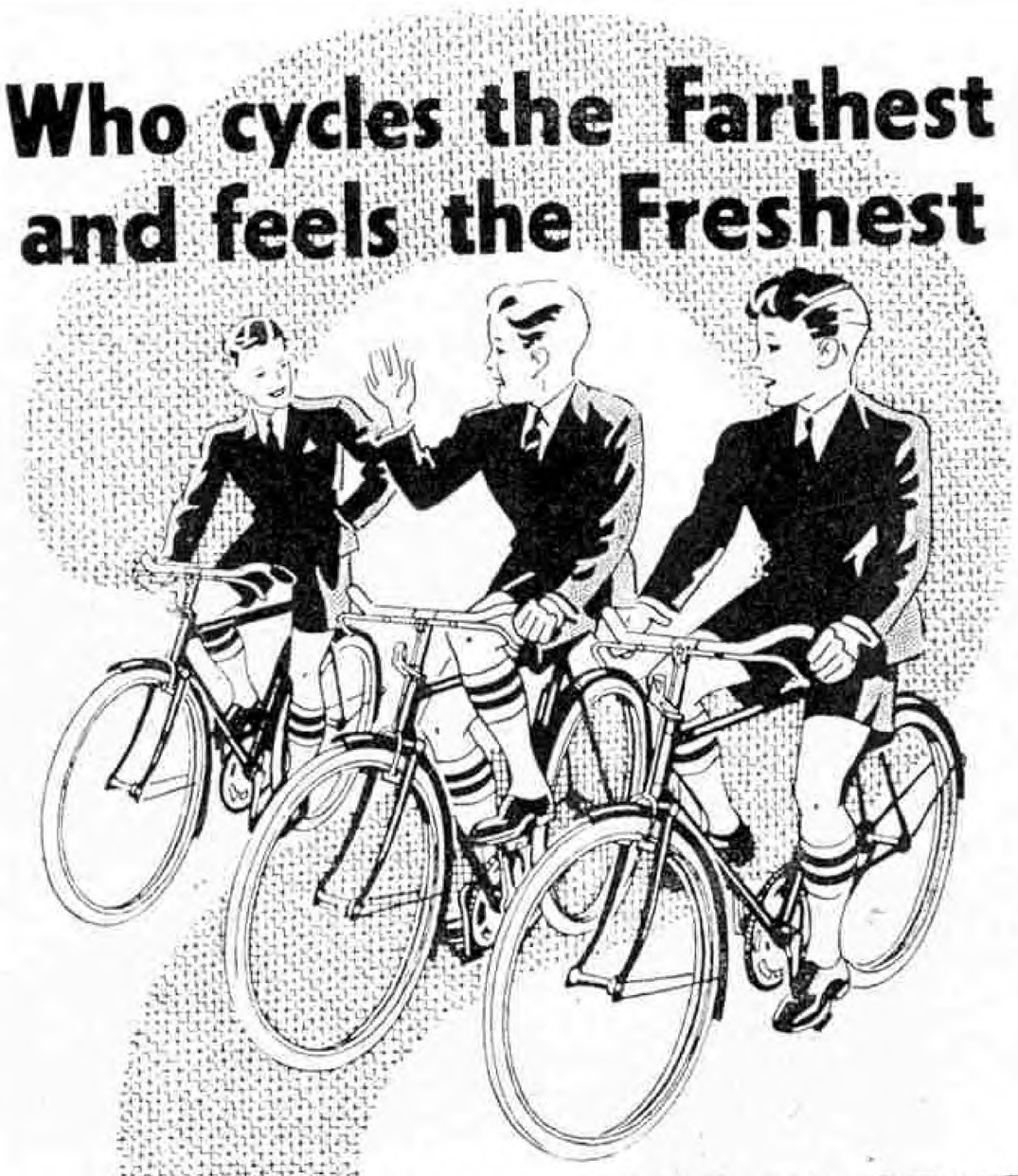
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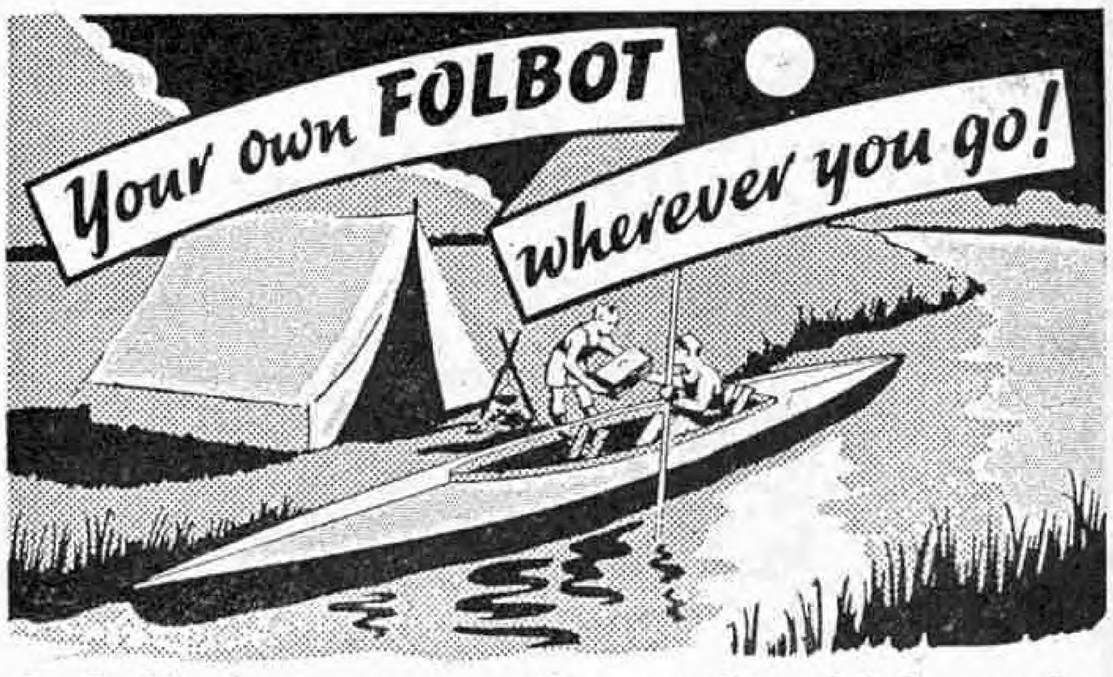
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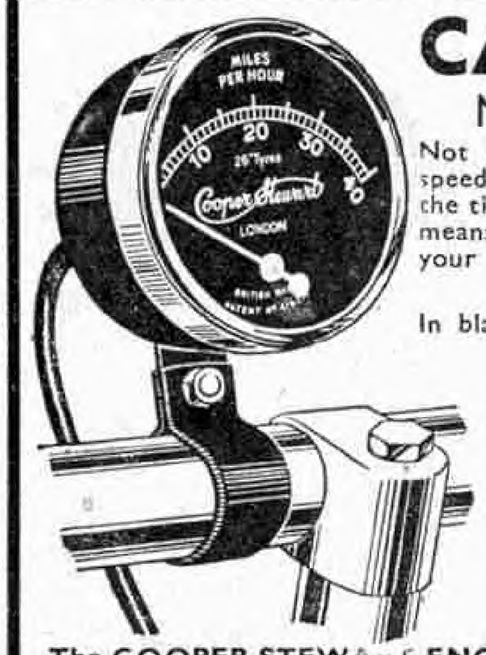
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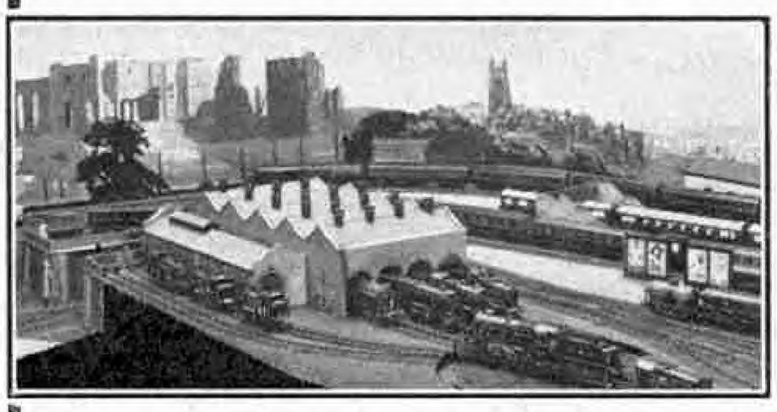
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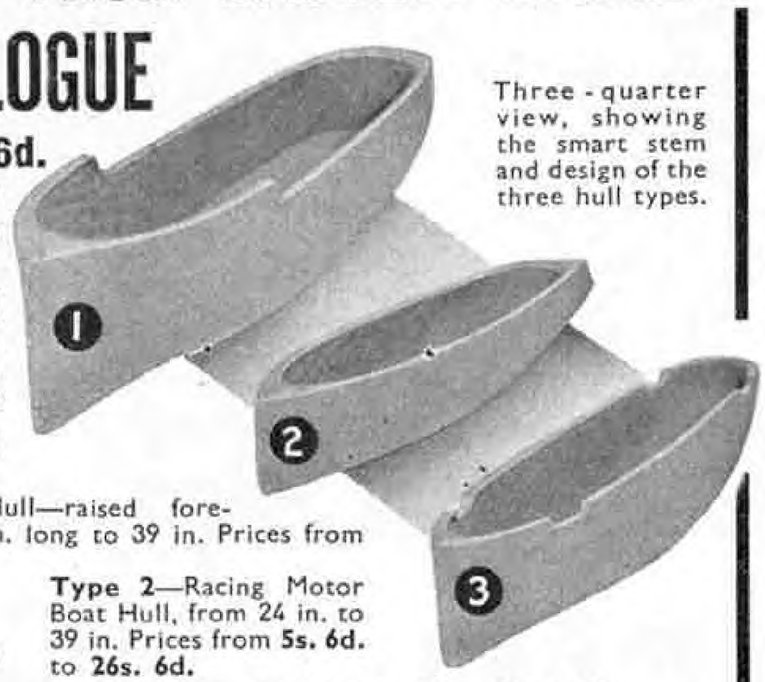
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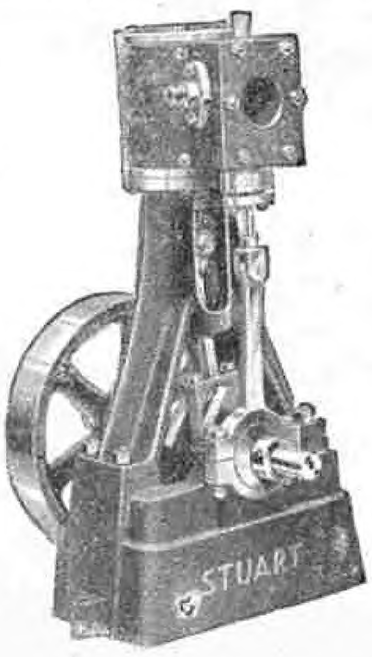
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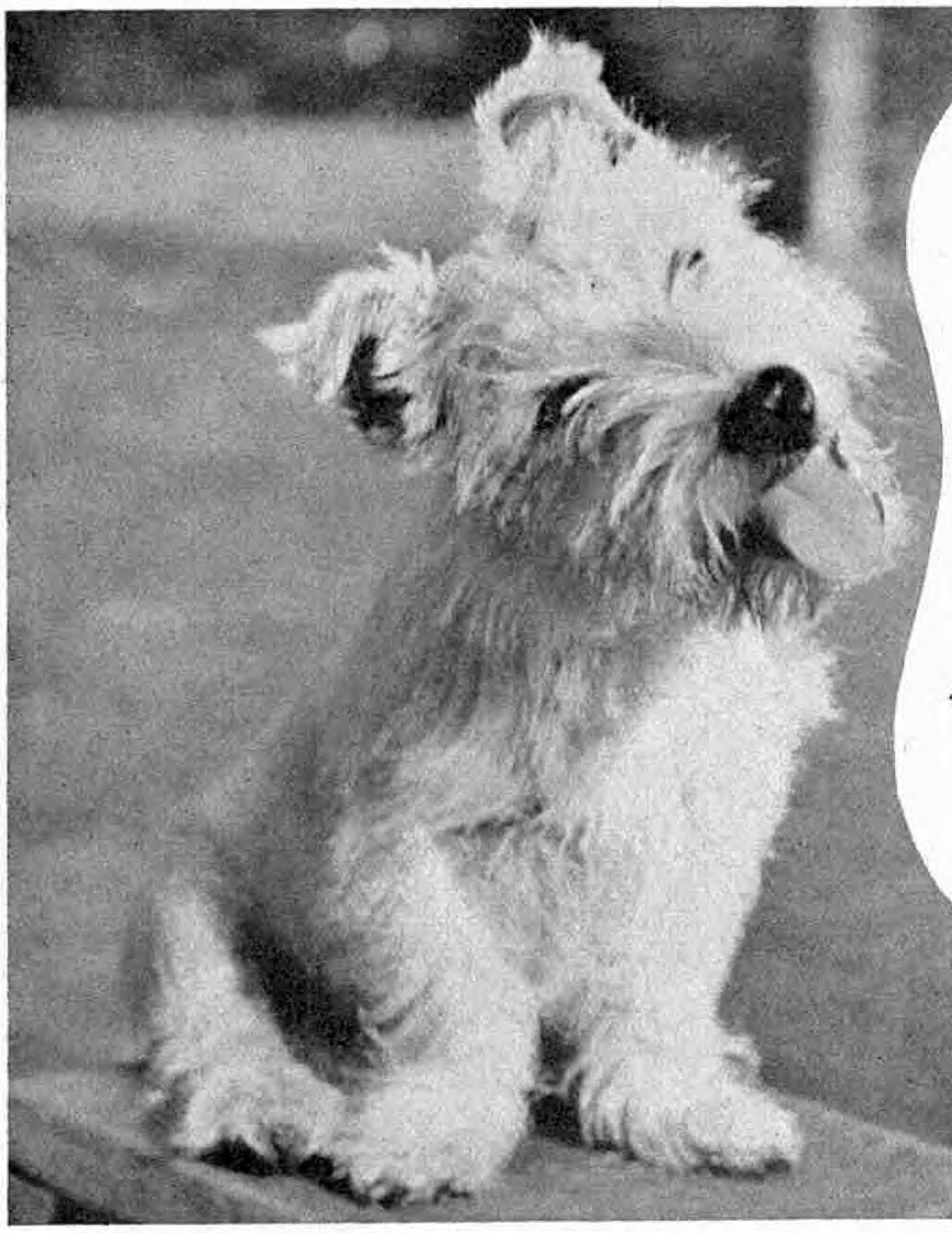
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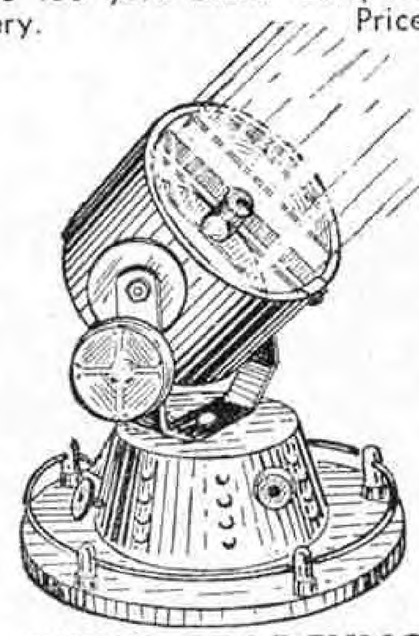
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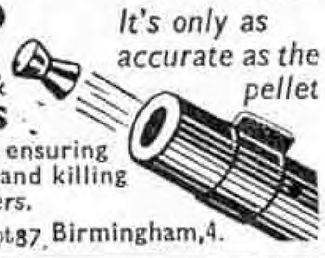
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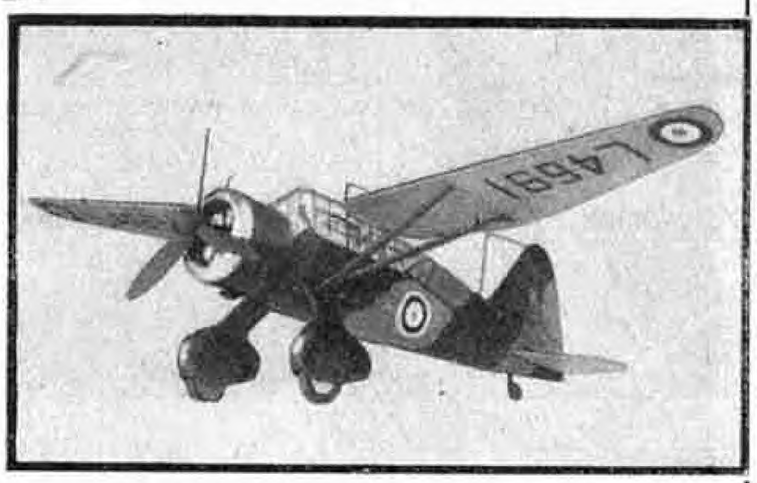
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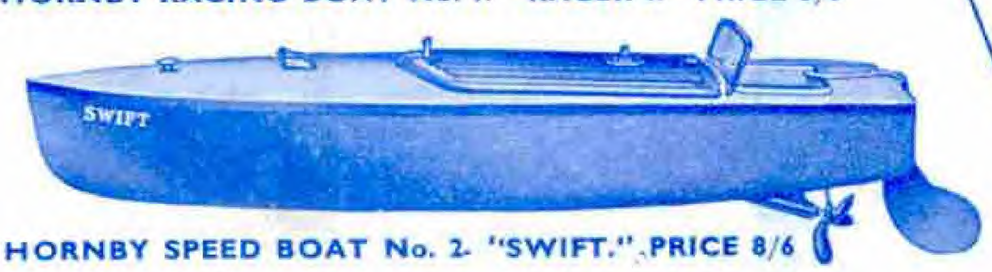
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